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Parts for Universal Joint Assemblies Require Careful Heat Treating

Efficient Machining Processes and Furnace Operations Aid Production of 250,000 Universal Joints a Month

By H. R. Simonds

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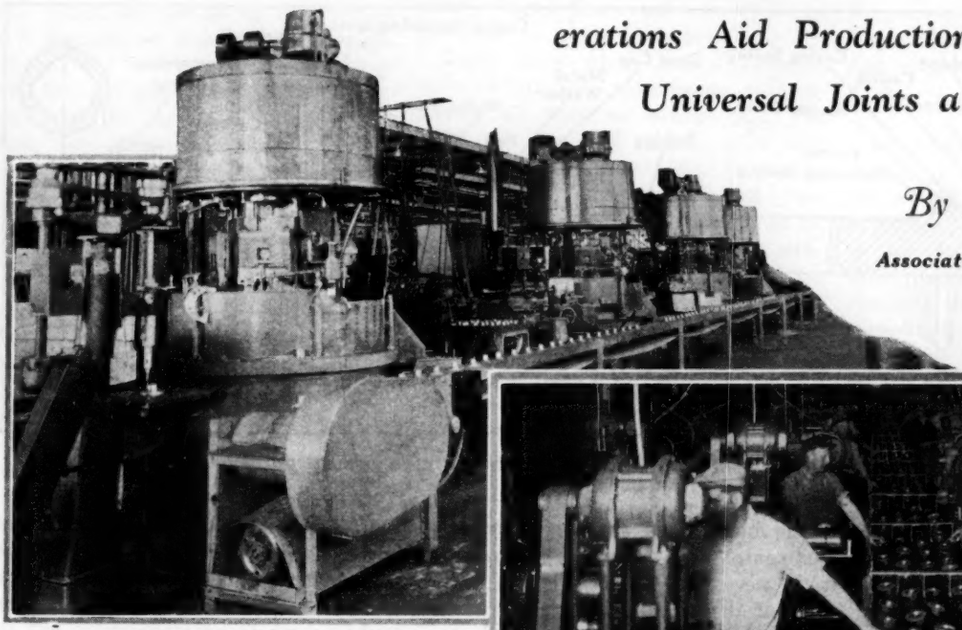


BELT conveyors are used to carry the work in process from one machine tool to another through a long straight-line series of operations. The belts, in addition to conveyors, act as pace setters

A LARGE share of the universal joints used in automobiles manufactured in America is produced at the highly specialized plant of the Spicer Mfg. Corp., Pottstown, Pa. At present the production averages 250,000 joints a month. In addition to careful design and workmanship, one of the essential factors entering into their manufacture is the proper heat treatment of the several component parts. The Pottstown plant, now the chief universal joint unit of the Spicer company, makes nothing but universal joints and therefore has been able to standardize its heat treating operations and to install equipment which insures uniformity and low cost operation.

In keeping step with the active automobile industry the plant for many years has maintained a continuous process of expansion and improvement. In ten years its output has increased tenfold. Present production involves the handling of 1500 tons of steel each month, the bulk of this steel comes to the plant as forgings, shipped in carload lots from another unit of the Spicer Mfg. Corp., located at South Plainfield, N. J. The forgings are shipped in sheet steel containers provided with legs for lift truck handling. The con-

tainers have a capacity of approximately 2 tons each, and by their use one man with a lift truck is able to unload a full car of forgings in 15 minutes. Transportation of material from one department to another within the plant is also by means of lift trucks; but material handling within each department is largely by conveyor belt.

After the forgings are received and weighed they go to the snagging and sand blast department and from there go direct to the first heat treating operation. Different parts receive different heat treatment, due partly to the special properties required for different parts and partly to the fact that small pieces require a different heat range than large pieces.

A typical operation is found in the treatment of the so-called journal piece. This piece is S.A.E. 1045 steel, of the following analysis: Carbon 0.40 to 0.50, manganese 2.40, sulphur 0.045, and phosphorus 0.05 per cent. Its heat treatment is automatic.

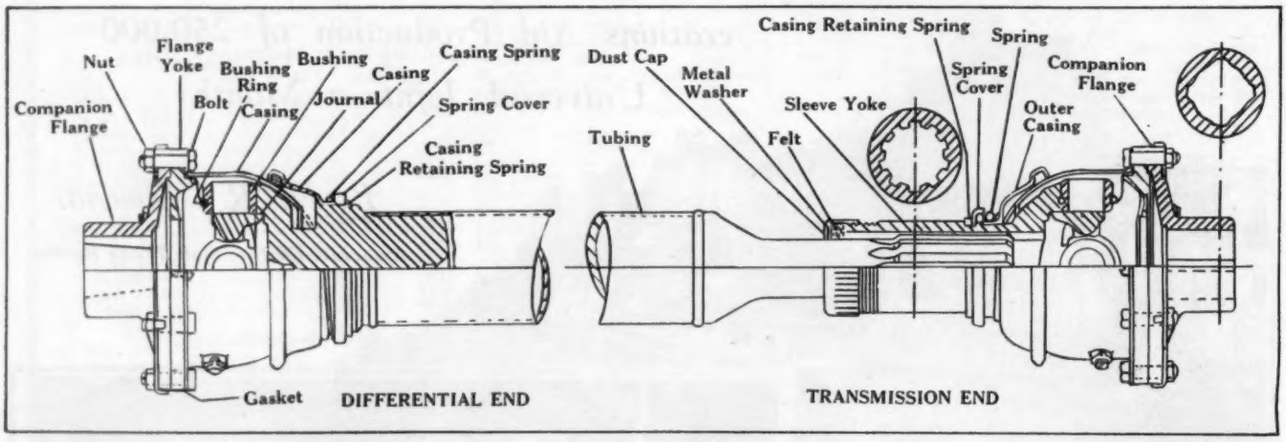
Bucket Conveyors Used

The forgings are dumped on to a bucket conveyor which carries them up into the open end of a screw-type furnace. As this furnace revolves it gradually forces the forgings along its spiral grooves from one end to the other and finally discharges them into water held at 90 degrees Fahr. From the bottom of the quench bath a second bucket conveyor carries the cooled pieces up to another furnace for the draw heat, after which they are allowed to cool in air. The temperature of the first furnace is 1550 degrees Fahr. The draw temperature is 1160 degrees Fahr. and after completion of the sequence, the brinell hardness must be between 370 and 410.

From the heat treating department the journal pieces follow through a remarkable series of high-production machining operations. Because the product of the plant is of the same nature year in and year out, it has been possible, as with automobile plants, to establish elaborately conceived straight-line production operations. The heat treated parts arrive by lift truck at one end of a long row of machine tools grouped along both sides of a slowly traveling conveyor belt. Here they pass from one machine to another with a minimum of lost motion.

Sequence Is Varied

With some pieces as, for instance, with the journal piece just described, it is possible to complete the heat treating first and then to send the pieces through the full line of machine finishing operations, the pieces going direct from the end of the belt to the final testing and assembling department. With other parts, however, it is necessary to heat treat after some of the machining has been done. A piece known as the stub shaft is one which receives special heat treatment. A brief description of this particular piece will serve to illustrate the high production character of the plant's operation. The forging for the stub shaft is upset on one end to form an open thin walled cup. Because of this peculiar shape the parts become unduly hard after this end is forged and to overcome this tendency the pieces are normalized before entering the first machining operation which is centering, followed by broaching a slot for driving during succeeding operations. With the slot finished the pieces go to automatic machines where they are turned complete with four diameters and five profiles at the rate of 200 pieces per hour per machine. The next operation is unusual, also one of high production. Three diameters are ground at one time with three different grinding wheels at the rate of 300 pieces an hour. The pieces go after grinding to an 8-spindle hobbing machine and then they are returned to the hardening department, where they are placed in a special type of furnace designed to permit fractional quenching. This furnace has grooves in its floor extending lengthwise from receiving end to discharge end. The pieces to be hardened are placed in the grooves one behind the other in lines. A rotating shaft at right angles to the grooves and outside of the furnace at the receiving end has a series of spiral cams mounted on it, one opposite each groove. These spiral cams act as pushers to force the rows of partially finished stub shafts along the grooves in the furnace. The cams are set each with a different degree of rotation about the shaft, so that the rows of stub shafts are not pushed forward all at one time but successively, first one row and then the next. Short slots at the start of each groove enable the pusher cams to revolve.



Reproduction, in part, of a working drawing, showing the general design of a typical automobile universal joint

Only Partially Quenched

At the discharge end the pieces are taken from the furnace by hand with tongs and dipped in the quench tank so that the butt end remains above water and therefore unquenched. After this quenching process they are set in racks to cool and later are returned to the machining sequence. The temperature in the furnace for this heat treatment is about 1510 degrees Fahr. and the quench bath is held at 80 degrees. The first operation after hardening is straightening, accomplished on a hydraulic straightener provided with a dial gage.

Some parts which are of low-carbon steel are carburized before heat treatment. These range from 0.10 to 0.20 carbon. The carburizing is done in steel furnaces of the rotating cylinder type, heated on the outside with

gas flames. The parts are shoveled into the cylinders along with the carburizing compound. The compound is the standard bone carbon which after use is mixed three parts of old to one part of new to form the charge for the next carburizing cycle. The temperature during carburizing is from 1430 to 1500 degrees Fahr., and the depth of case is determined by the length of time the pieces are held in the furnaces. The case desired is from 0.04 to 0.06-inch and to get this the work is held in the furnaces for 5 hours. After carburizing the now case-hardened and soft-centered parts are heat treated. This is done in an automatic electric furnace recently built for the company in accordance with the design of its own engineers. The furnace is 25 feet long and has a capacity of 1000 pounds per hour. The pieces travel through it on a special composition belt. They are fed on to this belt a short distance in front of the furnace and as they enter the furnace they pass through hydrogen flames which help keep the air, with its oxidizing effect, out of the furnace.

Discharged Under Water

After passing through the furnace, the pieces are discharged through a chute which has its lower end under water. The temperature in the furnace is 1460 degrees Fahr. at the receiving end and 1500 at the discharge end. The quench water is held at 116 degrees Fahr. by live steam with an automatic control. The quenching tank is 14 feet deep and the water at the bottom is about 20 degrees cooler than at the top. At the bottom the pieces fall onto a conveyor which carries them up and discharges them into wire baskets where they are allowed to dry before being placed by cranes in the draw furnace for tempering treatment.

The furnace used for the draw heat is a Homo-type of air furnace manufactured by Leeds & Northrup Co., Philadelphia. This is electrically heated, automatically controlled and is provided with a reversing fan which circulates the air violently first in one direction and then in another. The draw temperature is 330 degrees and after this heat the forgings are allowed to cool at room temperature.

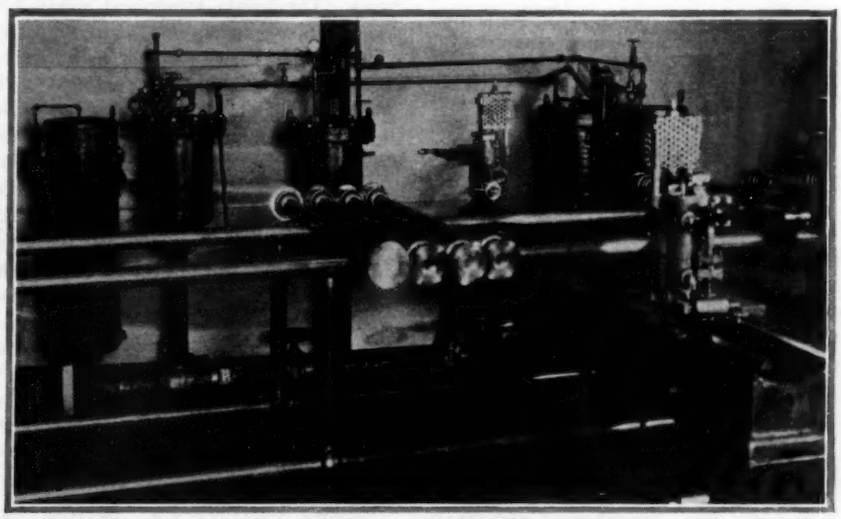
Other parts which are heat treated follow through much the same process as those already described. With the exception of the tubing the pieces are all relatively small, that is up to 6 or 8 inches in length, and they thus lend themselves readily to automatic and semiautomatic operations. This is particularly true in the machine shop where, as already indicated, the pieces travel from one operation to the next on a conveyor belt.

Parts are discharged from this heat treating furnace into the quench tank, which is 14 feet deep. Bucket conveyors retrieve the parts and carry them up out of the tank and on to the next operation

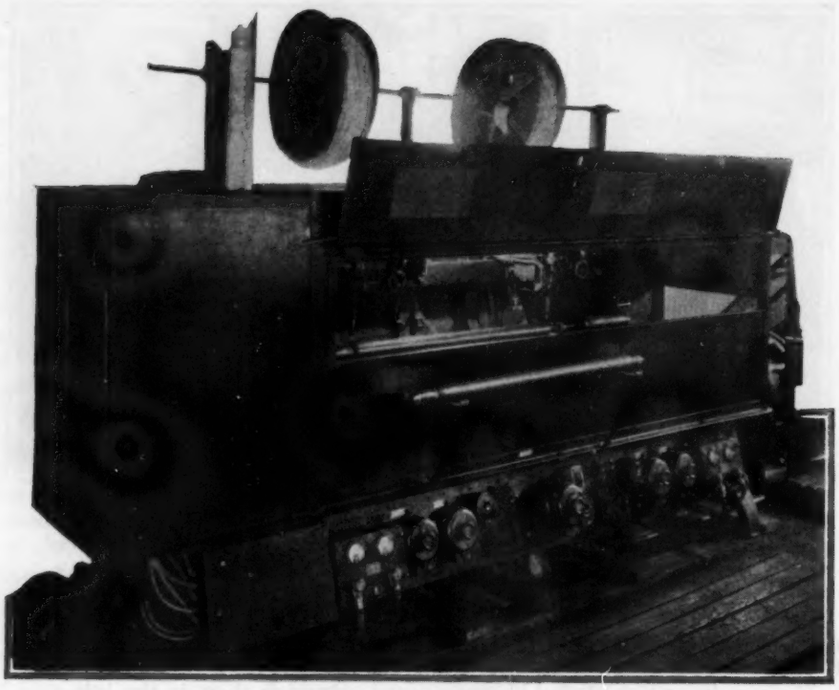
These belts which travel between rows of machine tools serve as pace setters as well as conveyors. The belts are about 30 inches wide and are divided into four aisles by means of thin steel strips supported just above the belt surface. The speed of the belt travel which is 7 feet a minute is arranged to give a definite output at the discharge end and the various operations then are designed to meet this belt speed. If, for instance, the operation on one tool at one point requires more time for completion than another operation at a different point in the sequence then more of the slow output tools are installed to compensate for the difference. The belts are interwoven canvas belts, treated and cured, and supported about four feet above the floor. This height has been found by experience to reduce to a minimum the work of taking pieces from the belt and returning them to the belt.

Automaticity Is Aim

In many other ways changes constantly are being introduced to lessen the actual physical work of the operators. Chucking operations are nearly all hydraulic. One particularly rapid operation is on a hydraulically-operated milling machine. This machine mills three pieces at a time, turns them out at the rate of 450 pieces an hour and is operated entirely by one man. Another high-speed operation is the drilling of six holes in the flange yoke. This is done in one operation on a multiple-spindle drill at the rate of 350 per hour. The tool is located close to the conveyor belt and is foot operated. The chucking is semiautomatic and one man with the pieces brought to



After the joints are completed they are filled with grease at high pressure. Greasing rail with pump and equipment are shown here



One of ten automatic electric arc welding machines used for fastening the tubing to the end assembly units of the joints

him on the belt at the right speed is able to put the work through an accurate operation at the rate of nearly six a minute.

Production methods have been carried on through the inspection. Center lines of ground holes are checked on special jigs equipped with dial indicators. After inspection the pieces are washed and then go either to the finish storeroom or to the assembly room.

Tubing Is Welded

A standard type of Spicer universal joint consists, as shown in an accompanying illustration, of two sets of companion flanges and two movable heads or joints connected by a member known as tubing. This tubing transmits the power of the engine through the universal joints and its design is an important feature of the total assembly. Originally this connecting member was a solid bar which added greatly to the weight and the vibration. As engine speeds have increased, it has been found more and more important to have all parts of the universal joint in absolute balance, so that no tendency will be present for the unit to develop synchronous pulsation. From the heavy steel bar the next development was seamless steel tubing. This was strong and much lighter but the wall thickness was not sufficiently uniform to prevent vibration at high speed and a further development was necessary. The present tubing is of welded construction and is made up from sheets by a process developed through cooperation of steel mill and Spicer Mfg. Corp. engineers.

Steel specifications for the tubing are as follows: Carbon 0.08 to 0.10, manganese 0.30 to 0.60, phosphorus 0.045 and sulphur 0.03 per cent. This tubing has been found to have the same strength as seamless drawn tubing with approximately half the weight, and with much better balance features. It is joined to the two end assemblies of the universal joint by welding. The operation is performed on an automatic electric arc welder which welds both ends of the tubing simultaneously. One of ten of these automatic welding machines is shown in one of the accompanying illustrations. The joints assembled ready for welding are placed one at a time on rollers beneath the welding point. One end of the joint is then fastened to a revolvable head. The doors then close and this automatically starts the piece revolving and sets the welding point in operation. When the door opens a master switch opens so that there is no possibility of the welding starting while the operator is setting the work.

The wall thickness of the tube now used is 0.083 inch. It formerly was 0.120 inch and experiments with new tubing indicate that the company eventually may use for its standard universal joints a tubing having a still thinner wall.

Shoewe Foundry Co., Detroit, has changed its name to Service Foundry Co.

Standards Bureau Tests Nitriding Process

Nitriding, the method of case-hardening steel to give a case considerably harder than the former method of carburizing has been completely studied and tested by the bureau of standards, Washington. The results of the work will be published in a forthcoming issue of the *Journal of Research*. In this method the heating is done in an atmosphere of ammonia gas, and from this substance the nitrogen is obtained; this step corresponding to the former heating of the steel in carbonaceous material. A distinct advantage of the new method is that the temperature required for hardening is only about 900 degrees Fahr. as compared with 1700 degrees Fahr, required in the former method.

The bureau of standards has used the usual method of studying the alloys, and has found that pure iron appears to form three definite compounds with nitrogen containing respectively 4, 6 and 11 per cent nitrogen. The intermediate compound containing 6 per cent nitrogen appears to be the one to which the hardness of nitrided iron is due. It was found not practicable to harden ordinary carbon steel with nitrogen on account of the insufficient hardness and brittleness of the surface layer in nitrided iron, and special alloy steels containing aluminum, and sometimes molybdenum, and chromium are used. Because the article is hardened as a result of the heating in ammonia alone, articles do not warp during nitriding as they often do in case hardening, and the expense of grinding and straightening is saved.

Increases Advertising

The Austin Co., industrial engineer and builder, Cleveland, is increasing its 1930 advertising budget 20 per cent to take advantage of the increased industrial building opportunities which delegates to the company's convention in Cleveland recently predicted in their districts for 1930. W. J. Austin, president, indicated that if a necessity arose a still further increase will be made.

The consensus of opinion at the convention, called the "New Era convention" and attended by 75 district managers and sales engineers from 16 cities, was that 1930 will be a year of unusual building activity. An extension of Austin Co. activities into European companies other than Russia, in which the company now is erecting a $40,000,000 automobile plant and model industrial city, is contemplated.

New Fields for Alloy Steels Opened by More Exacting Demands

Bridges, Rails, Airplanes and Cutting Tools Constitute Four Typical Applications Where Alloy Steels Meet Need for Improved Physical Properties

By C. E. MacQuigg

Director, Union Carbide & Carbon Research Laboratories Inc.

RECENT developments in applications for steel, especially alloy steels of all types, have been enormous. Alloy steel tonnage in 1928 amounted to 3,214,909 tons, 6.2 per cent of the total steel production for the year. This great tonnage finds its way into a widely diversified range of products.

Qualities sought in a steel for a given purpose will, of course, depend on the particular use to which it is put and this leads at once to the explanation of the reason for so many different types of steels. The metallurgist is seeking continually to develop some new property or to accent those properties already present. A definite statement of the requirements is sometimes lacking and it is not always possible to make a precise mathematical expression of the qualities possessed by the alloy.

Must Evaluate Qualities

It is important, however, for the engineer to evaluate those qualities of the steel in which he is interested and this has led to the familiar tests for hardness; resistance to rupture in tension, shear or bend; ductility and those other qualities known variously as yield point, elastic limit, proportional limit and recently "creep limit." Still other properties are of great importance for special applications though less frequently of direct bearing, such as magnetic permeability, impact strength, metallographic properties including freedom from inclusions, segregations and grain size. Data obtained from these tests have led to the attempt at rationalization of the various concepts into one expression by which it would be possible to compare one steel directly with another.

From the foregoing it will be understood that the metallurgist at best cannot do more than compare a few of those qualities on which the engineer must depend for the stability of his creation and after all the most convincing criterion of suitability is the service test. The whole story of steel has been one of constant progress, a constant effort to meet ever increasing demands for enhanced properties. Ordnance material furnishes a typical example of this unceasing demand—shells to pierce the invulnerable armor—then armor to withstand the armor-piercing shells, and so on.

Considering for the moment by what means some of the needs for steel are being met with particular compositions and properties, the question of steel for structures is appropriate. Under this heading are bridges, one of the earliest applications for steel in structures. The first large bridges were made of cast iron or wrought iron, the initial extensive use of steel coming with the suspension bridge. As the designs of the steel arch and cantilever types were perfected with increased size, the necessity for higher unit stresses led to the adoption of heat-treated plain carbon steels and the use of alloy steels. The Eads bridge, built over the Mississippi river at St. Louis in 1874, made use of steel containing 0.61 per cent chromium and 0.79 per cent carbon. The elastic limit of this chromium steel in compression averaged 60,000 pounds per square inch and the tensile strength 115,000 to 140,000 pounds per square inch.

Nickel Steel Is Used

Prior to the Brooklyn bridge, suspension bridges were made with wrought iron wire cables, steel being used in wire for the Brooklyn structure. The Williamsburg and Queensboro bridges—the latter the largest cantilever bridge in the world—both have substantial tonnages of 3.50 per cent nickel steel, and heat-treated eyebars are being used extensively in many modern bridges. These are plain carbon steel, water quenched, drawn and straightened in a gaging press.

It may be remarked in passing that as the modern bridges become larger and larger, the proportion of dead load to live load became increasingly greater until in a bridge like the new Hudson river bridge the live load is comparatively insignificant. It is imperative, therefore, to keep the dead weight as low as possible and this can be done only by using higher unit stresses. If the elastic ratio of the steel for example can be raised 10 per cent, the dead weight can be reduced 25 per cent and

Cites Rapid Ascendancy of Alloy Steels

PRESENT adaptations of alloy steels and how they have solved a multitude of problems where the question of physical properties was paramount are set forth in the accompanying article, being portions of an address presented by C. E. MacQuigg, director, Union Carbide & Carbon Research Laboratories Inc., Long Island City, N. Y., before a recent meeting of the New York section of the American Institute of Mining and Metallurgical Engineers. Developments in applications for alloy steels have been so rapid in the past five years that in 1928, *over 6 per cent of the entire production of steel in this country was alloy steel; to be more exact,* 3,214,909 *tons, including copper-bearing steel.*

the cost of the bridge correspondingly reduced. Given sufficient confidence in his steel the bridge builder of the future may have so revamped his ideas as to permit considerable flexibility in the structure.

In the case of rail steel the same story may be told again, namely, a jacking-up process applied to the properties being demanded. This is because of the fact that unit stresses are being raised due to the ever increasing wheel loads. This has led not only to an increase in the weight of the rail section but the marked raising of the carbon content to make a stronger and stiffer rail. Inasmuch as rails at times may develop unit stresses of between 50,000 and 100,000 pounds per square inch, the trial of alloy steel was not an illogical step. One of the first high alloy steels was the 13 per cent manganese steel, better known as Hadfield's steel. This metal exhibits extreme resistance to wear when severely punished by pounding and shock, and is unusually tough, but in the form of a rail is expensive.

Lower Manganese Content

Following satisfactory results obtained by medium high manganese steels for forgings, the medium manganese steel rail has been developed. The usual composition for this rail in heavy sections is 0.55 per cent carbon and 1.50 per cent manganese. Use of this steel has expanded notably in the past few years, annual consumption by one system alone having risen from 50,000 to 80,000 tons in three years. Medium manganese rails cause somewhat higher rejections due to piping but less segregation is found as well as an appreciably higher percentage of first rails. The wear is about one to two-thirds less on the manganese than the plain carbon rails.

In an effort to make use of the high wear resisting quality and air-hardening properties of a chromium steel, some work has been done recently in developing a rail with 3 per cent chromium and low carbon content. It was reasoned that such a composition would give a dense, small grain in the center of the head plus high tensile strength and wear resistance due to the chromium content, while ease of machining toughness and ductility would be assured by low carbon content. A recent report on the behavior of a high-chromium rail steel in England has been enthusiastic as to the service obtained.

The use of alloys need not be expected, however, to eliminate transverse fissures if, as seems to be the present consensus of opinion, they originate in the proces of manufacture. Alloying elements will only add strength, toughness or resistance to wear and under some conditions may require even better manufacturing technique.

Developments in aeronautics have signaled a new era in airplane steels, bringing on an increasingly widespread demand for enhanced physical properties. The early airplane fuselage was constructed throughout of wooden members covered with suitable fabric. The next advance in design was the substitution of metal framework, still retaining the wooden wing structure. Because metal has decided advantages in lacking sensitivity to moisture and because wood will snap in failure while metal will bend, a decided trend has developed toward replacement of wood with metal in all of the main stress carrying members of aircraft. Among the advantages claimed for metal over wood in aircraft construction are that it is durable, fireproof, decay proof and insect proof; will not splinter on rupture, spring or warp; has less variation in strength, longer life and safer joints; and requires less repair and no tensing up. The latest step is the substitution of sheet metal for fabric and the day of the all metal plane apparently has arrived, at least for the big ships.

The demand for high tensile wire for aircraft is increasing since where construction permits, high unit stresses may be carried and high tensile strength can be developed by wire drawing. In connection with the joints of aircraft frames chrome-molybdenum steel is being used largely today. This steel has been selected because of its toughness and reliability under heat treatment. Further instances might be cited in the development of the demand for greater strength, increased resistance to wear and the superlative in almost every property for some applications at least. So much is being heard about the use of nitriding as a surface hardening method that it is unnecessary more than to mention the use of aluminum, vanadium and molybdenum in this field.

Higher Tool Production

Any discussion of developments in the steel industry must include a reference to cutting tools, not because of the volume of metal in the tools themselves, but because the costs of the products of many industries depend largely upon the efficiency of the tools used in their manufacture.

Increased production per unit of labor time is brought about by co-operation of the metallurgist and the machine tool builder. The metallurgist's duty is to produce a tool that can do more work than its predecessor, and the engineer must then build machine tools which can take advantage of this increase. Cutting tools in general use at the present time are made of plain carbon steel, high-speed steel and Haynes stellite. When each of these tools was introduced it was a great improvement upon existing tools and each of them has contributed greatly to industrial development. By the use of stellite tools it is now common practice to machine fully cylinder blocks at a cost of $1.13 for direct labor, this charge including all the work necessary to make the rough casting ready to be placed in the motor assembly line. The same work if done with less efficient tools would cost a great deal more in direct labor and also would require a much larger investment, inasmuch as a greater number of machines would be needed to give the same output if operated at the slower speeds necessitated by other tools.

Tools Prove Economical

With respect to the use of high-speed steels, it is estimated that about 20,000,000 pounds is produced annually with the following distribution: Twist drills, reamers, counterbores and formed tools, of that type, 30 per cent; cutters, hobs, mills and formed tools of similar types, 25 per cent; disks, punches, etc., 15 per cent; turning tools—lathe, planer, shaper and boring tools, etc., 20 per cent. It is estimated also that $200,000,000 a year is saved by the use of high-speed steel tools in the manufacture of automobiles alone. This represents only actual savings due to decreased machining expense and does not take into account savings resulting from decreased costs of additional machines and other facilities. As an indication of how some additional expense is saved by investment in higher-priced alloys, it has been estimated that less than $1,000,000 invested in tungsten in high-speed steel saves from two to three billion dollars annually.

Stellite, however, has not and never will displace high-speed steel, which in turn did not displace carbon tool steel. Each of these tools has a certain field in which it is superior to any of the others. In the case of stellite the field is that of machining cast iron, or of turning steel under fairly rigid conditions. High-speed steel tools have as their greatest field today the turning of steel parts on full automatic and semi-automatic machines. Plain carbon steel tools are used for some kinds of

finishing work and various turning jobs.

The search for tools that can be used at high speeds has resulted in the development of alloys having higher degrees of red hardness. All cutting operations generate heat at the cutting edge. This tends to soften the edge of the tool, and obviously the metal that will remain hardest while hot will be able to stand up at the highest speeds, other conditions being the same. Cutting tool alloys now in general use, if listed in the order of increasing red hardness, are carbon steel, high-speed steel, cobalt high-speed steel and stellite. More recently another type of tool known as tungsten carbide has appeared on the market. For many years tungsten carbide has been known to be an extremely hard compound that unfortunately was too weak and brittle to be of much practical use. Experimental work carried out in Germany over a period of ten years led to the development and the marketing of so-called cemented tungsten carbide tools, which are made by sintering a pressed mixture of tungsten carbide and cobalt powders. Tungsten carbide tools also may be made by melting and casting, which is a simpler and more direct process than sintering.

During the past two years tools of this kind have appeared on the American market and have been given more or less extensive trials by various manufacturers. Tungsten carbide tools, owing to their high mineral hardness, which lies between corundum and diamond on the hardness scale, will machine products heretofore considered unmachinable. They are able to turn such materials as glass, porcelain, fiber, manganese steel and hardened steels; they also compete with diamond tools for certain operations. Tungsten carbide tools are found to be successful in turning cast or chilled iron, on which work they have a life sufficient to justify their high cost. Machine tools are being built that will permit the manufacturer to take advantage of the fact that such tools can be run at higher speeds, thus resulting in still lower labor costs per unit of product.

Parts Could Be Hardened

The tools offer the possibility of a distinct and definite change in the types of steels used for certain particular purposes. If it should prove feasible to use them for turning, milling, and drilling harder steels than can be handled by present practice, it will be possible for the manufacturer of automobiles or other machines to use harder and consequently stronger steels for any parts subject to heavy stresses. Such parts as crank shafts could be hardened and still be machinable with these tools. The production of stronger parts opens the possibility of using lighter sections, thus securing all of the indirect advantage that usually would result from a decrease in the weight of moving parts.

During the past ten years, particularly the past five years, knowledge of the stable surface types of alloy steels has increased greatly and much information has been published respecting their properties and uses. They may be classified variously as to purpose, but all will be found to meet some special conditions of attack. Two elements chiefly are responsible for surface stability, namely, chromium and nickel. Other elements are added to bring out special properties, among them tungsten, molybdenum, cobalt, vanadium and zirconium. In the field of high-chromium corrosion resistant steels alone, it is estimated that the annual production is about 25,000 tons.

The dirigible R-101 contains 27 miles of alloy steel and aluminum alloy tubing. The steel tubing consists of carbon, 0.16 to 0.22 per cent; silicon, maximum 0.5 per cent; nickel, .1 per cent; and chromium, 12.50 to 14 per cent. Sheets and plates for fittings are carbon, 0.14 per cent; silicon, 0.36 per cent; nickel, 10 per cent; and chromium, 16 per cent. The alloy has a strength of 200,000 pounds per square inch, and a special system of hardening and tempering has been employed. The steel, in the form of strip, is heat treated by passing it through an electric resistance furnace and then through a water-cooled steel pipe where it is hardened properly. Following this a tempering treatment is made.

Completion of Ohio River Dams Provides Uninterrupted Shipping

THE recent completion of work that provides the Ohio river with a 9-foot stage from Pittsburgh to its mouth near Cairo, Ill., 968 miles away where it empties into the Mississippi river bears particular significance for steel producers of the Pittsburgh district, in addition to those companies located farther down the river. The steel industry has been making use of the Ohio river and its tributaries, the Monongahela and Allegheny, for many years in transporting coal from mines to the mills.

Recently, steel companies have been turning their attention to inland waterways as a source of lower freight for the movement of finished products, particularly to southern and southwestern points. This traffic has expanded rapidly, amonting to well over 1,000,000 tons for both the Ohio and Monongahela rivers during 1928. A further increase is in prospect for this year. These figures include semi-finished steel moved between various mills in the Pittsburgh district, but the longer hauls have been increasing at a rate corresponding to the gain in total movement. Prior to 1928, barge lines found it difficult to operate throughout the year, due to the low level of the water at various periods. Completion of the work on locks and dams makes uninterrupted service possible. The construction of the 49 locks and dams now in operation to provide a navigable channel represents an investment of about $125,000,000 and 50 years' work.

Large companies having their own barge lines and terminals at present are in a position to derive the greatest advantage from the navigability of the river, but the movement to provide facilities to serve small shippers gradually is getting under way. Pittsburgh and other cities on the Ohio are planning terminals and warehouses, while public barge lines are adding to their fleets. The Mississippi Barge Line Co., a $3,000,000 organization, recently applied to the interstate commerce commission for a certificate under the Dennison act. This act permits the commission to establish joint river and rail rates. The Mississippi line proposes to establish a common-carrier barge service between Cincinnati and New Orleans.

Benefits Smaller Companies

Smaller steel companies will benefit as the result of the recent reduction in freight on water shipments of steel products to West Louisiana, Texas, Oklahoma, and Arkansas, announced by the American Barge line, the largest public carrier operating between Pittsburgh and the gulf. This reduction results in a net saving of $2.20 a ton, compared with the all-rail rate.

Some idea of the volume of freight carried on the Ohio river and the Ohio river system is to be gained from

the following tonnage figures from 1890 to 1928:

Year	Ohio river net tons	Ohio river system net tons
1890	6,720,000	13,187,817
1900	8,360,000	17,400,997
1910	10,760,491	24,767,066
1914	7,589,161	21,399,757
1915	7,346,357	22,509,127
1916	6,044,914	22,171,473
1917	4,598,875	24,245,220
1918	6,171,413	28,015,534
1919	5,004,377	26,842,304
1920	9,382,464	41,917,748
1921	7,307,880	30,426,786
1922	6,291,826	27,689,142
1923	8,280,520	40,794,938
1924	10,866,683	40,665,545
1925	15,737,072	48,257,722
1926	19,754,978	54,426,472
1927	20,128,518	55,768,663
1928	20,938,267	57,827,861

Roughly speaking, nearly 6 per cent of the total tonnage carried on the Ohio consists of iron and steel products. For the whole Ohio river system, the tonnage represents a little more than 4 per cent. During 1928, iron and steel tonnage for the Ohio amounted to 1,239,973 tons and 2,409,251 tons for the system. The 1929 shipments probably will show an increase for in the first nine months the Ohio shows a total of 927,887 tons and the system accounts for 1,869,685 tons.

Glamorgan Pipe & Foundry Co., Lynchburg, Va., has changed its capitalization from 60,000 shares of no par value stock to 60,000 at $10 per share par value.

Announce Fall Meeting

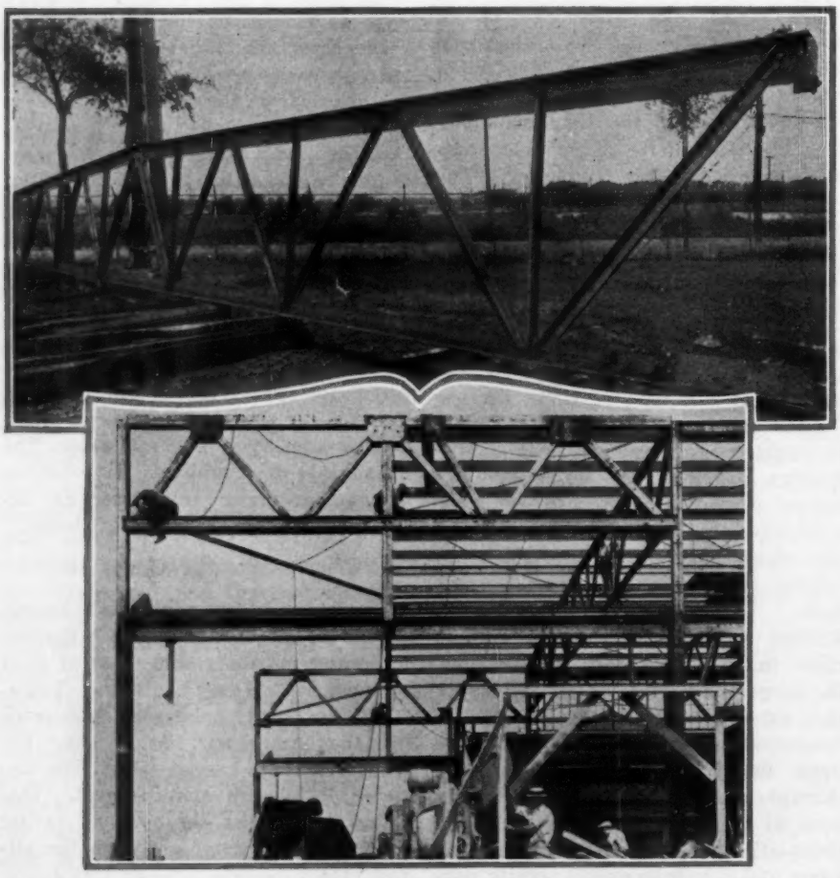
The American Electrochemical society will conduct its fall meeting at Hotel Statler, Detroit, in September, 1930. One of the features of this meeting will be a symposium "Prevention of Corrosion of Metals in the Automotive Industry," under the direction of F. N. Speller, metallurgical engineer, National Tube Co., Pittsburgh.

New Building Is Fabricated by Arc Welding

IN ERECTING a new building 200 feet long and 100 feet wide to provide additional space in its plant in Cleveland, the Lincoln Electric Co., specified that the steel framework should be completely shop fabricated and assembled by electric arc welding. The Lincoln company manufactures arc welding equipment and welded motors, and is a pioneer in the welding of structural steel. That the company should build its own plant addition by the arc method therefore was a foregone conclusion.

The new structure, which connects two existing buildings, is of the crane-mill type, and houses a 65-foot electric overhead traveling crane, as well as enclosing a two-track railroad siding. This latter feature permits the unloading of materials and the loading of outgoing shipments within the plant.

The building was designed and erected by the Austin Co., Cleveland, the steel being fabricated in the structural shop of this company. To support the roof ten trusses 67 feet long, placed on 20-foot centers were required. A typical truss is shown in the accompanying illustration. These trusses were formed with chords made from T-sections obtained by splitting 15-inch, 38½-pound I-beams down the center of the web. Each truss web member is composed of two angles welded to the chords on opposite sides of the web of the T, and tied together by straps welded to the flanges of the angles.



(Top)—Typical roof truss used in new arc-welded plant addition of Lincoln Electric Co. (Bottom)—The carrying trusses are shown in place. The end of the building shown at the left extends out over a railroad siding

Heavy Trusses Required

The crane runnway and the 8-inch 33-pound I-columns which carry the roof trusses are supported by 18-inch, 67-pound H-columns. The I-columns are spliced to the H-columns directly above the crane runway. These splices were made by arc welding ½-inch steel plates along the flanges and webs of the columns. The crane runway is formed by 20-inch, 59½-pound I-beams on top of which are placed the crane runway rails.

Over the railroad tracks heavy trusses are required to distribute the load from the roof trusses to the columns, and also to carry the crane runway. These trusses are composed of 8-inch, 17½-pound I-beams and heavy channels. One of the accompanying illustrations shows these trusses in place.

New Type Wrought Iron Compared with Old

Comparison of the properties of wrought iron made by the recently developed Aston method, and the similar product made by hand puddling, is the subject of a report which will soon be published in the bureau of standards

Journal of Research. The product made by the new process appears to have all the "ear marks" usually associated with the name wrought iron, while no significant differences in corrosion resistance of the two irons were revealed by the corrosion tests. The results of the tests indicated no marked or significant difference, although the new process iron, was more uniform in its structure than was the hand puddled product; on the other hand its tensile strength was slightly lower, although the ductility was higher.

The Aston process was brought out recently for wrought iron manufacture, and differs radically from the others in its operations, though perhaps not in principle. It is now being manufactured commercially. This process was described in detail on Page 382 of the Feb. 7, 1929 issue of IRON TRADE REVIEW.

Effects Large Saving in Machining Castings

By E. C. Kreutzberg

Associate Editor, Iron Trade Review

TO KEEP pace with the demand for its rolling mill equipment, the Treadwell Engineering Co., Easton, Pa., recently has devoted close study to the possibilities for cutting down the time required in the various operations incidental to production of this equipment. As a result, a particularly notable and spectacular saving has been effected in the machining of gear casings for rolling mill tables. The tables are built in multiple units, requiring all the way from 50 to 100 casings per unit, depending on the length of tables. The casings consist of two parts, upper and lower half, and it is the joint between these two castings that must be machined.

These castings formerly were faced on a 42-inch vertical turret lathe, taking up the full time of this machine, and also taking approximately 40 minutes of the operator's time for each casting.

By the new method, these castings are secured by studs on one of two round cast-iron plates, 14 feet in diameter and 4 inches thick, and faced on a 20-foot vertical boring mill, as shown in one of the accompanying illustrations. The plate has capacity for holding from 22 to 25 of these castings, depending on their size, the castings being arranged in a ring around the largest possible working diameter. The labor now required is the time of two men, the boring mill operator and his helper. While one plate-full of castings is being machined, the other is unloaded by the helper and reloaded with another set of castings to be machined.

The boring mill has two heads. The facing operation consists of one rough cut from the outside in, with one head, and another rough cut, from the inside out, with the other head, and both tools set to the same depth. After the roughing cut has been concluded, there is one finish cut across the entire surface, with only one head participating.

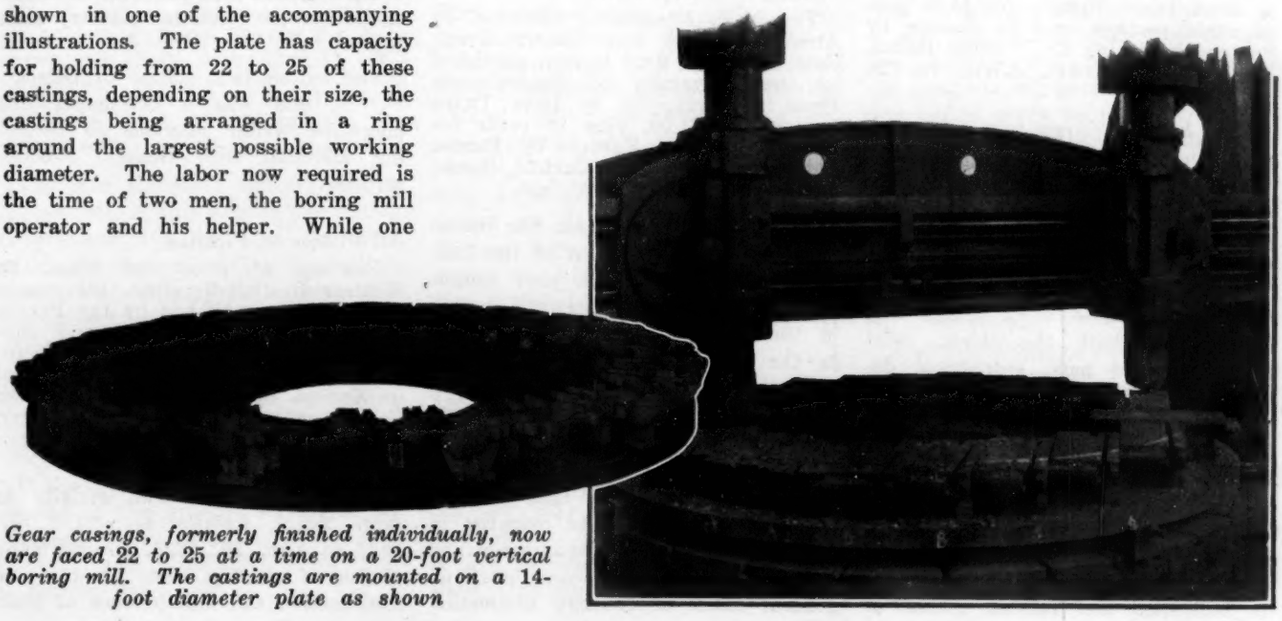
Former Time Is Halved

The time for complete machining of an assembly of 22 to 25 of these castings on the boring mill is 210 minutes on the average, which figures out to between 8 2/5 to 9 6/11 minutes per casting. Even allowing for the fact that a machinist and helper now are engaged, it is seen that the former time has been much better than halved.

In achieving this saving, the use of tungsten carbide cutting tools has been an important contributing factor. When the operation first was placed on the boring mill, high speed cutting tools were employed and the average time per casting then was approximately 12 minutes. It was necessary to grind the high-speed tools two or three times on each roughing cut and once on a finishing cut. The cutting speed with the high-speed steel was 25 feet per minute.

After introducing tungsten carbide, the cutting speed was increased to 65 feet per minute on the roughing cuts and to 100 feet per minute on the finishing cut. The grinding for the roughing cuts was found to be necessary once for every three or four set-ups, whereas for the finishing cuts the grinding was reduced to once for every six set-ups.

A calculation by the Treadwell Engineering Co., in connection with this particular operation, shows that after the increased cost of the cutting tools has been paid for by increased production, 90 per cent of the life of the tool still remains.



Gear casings, formerly finished individually, now are faced 22 to 25 at a time on a 20-foot vertical boring mill. The castings are mounted on a 14-foot diameter plate as shown

New Books Worth Reading

SCIENCE ECONOMICS BUSINESS

A Help to Trading

Tolley's Business Profits and Employments Tax Manual, 91 pages, supplied by IRON TRADE REVIEW for 75 cents, plus 15 cents for postage, and in Europe by Penton Publishing Co. Ltd., Caxton House, London, for 5s.

This book is useful for businessmen who trade in Great Britain. This is its second edition, which has just been published. The new volume has been considerably increased in size and includes a section on employments and offices. It explains at length the alterations which have taken place in the system of assessments, and deals completely with the whole subject of profits derived from business. It explains in detail what profits are or are not assessable, and what expenses will be allowed or rejected. There are a number of examples of business profits assessments, and a convenient index. Over 230 legal decisions are referred to and explained.

* * *

Art of Melting Iron

Melting Iron in the Cupola, by J. E. Hurst; cloth 240 pages; 6 x 9 inches; published by the Penton Publishing Co., Cleveland, and supplied by IRON TRADE REVIEW for $5.00 plus 15 cents postage, and in Europe by Penton Publishing Co., Caxton House, Westminster, London, S.W.1. for 26 shillings, net.

This book, a large part of which ran serially in THE FOUNDRY from September 1, 1928 to July 1, 1929, inclusive, covers practically every phase of cupola construction, operation and maintenance. It is written and illustrated in a way to appeal to every foundryman whose work brings him into contact with the oldest, most convenient and most economical device known for melting iron in the foundry. The author, J. E. Hurst, is joint inventor of the Hurst-Ball centrifugal casting process which involves the most expert cupola manipulation. He is a well known British foundry metallurgist, author of *Metallurgy of Cast Iron* and many papers on individual and related phases of the same subject. The scope of the work may be inferred from the eleven chapter headings which include: Historical, construction, operation, charging, receivers, combustion, tuyeres, specials, blowers, linings and briquets. Each of these subjects is treated thoroughly informatively. Original work on the part of the author has been supplemented by exhaustive investigation of work carried on by other practical and scientific foundrymen in this field and their theories and findings have been incorporated in the text. The book will meet the requirements of the novice who is making his first acquaintance with the foundry cupola. It will serve as a text book for those who desire to teach cupola melting theory and practice to others. To those already familiar with the subject, the book will prove an invaluable reference with its wealth of illustrations, tables, formulas and other statistical data. In addition to 126 illustrations, and a detailed list of contents, the book carries a cross index listing over 1000 items.

* * *

Tracing Foundry Drift

Trends in Foundry Production, by Anne Bezanson and Robert Gray; cloth, 77 pages, 6 x 9 inches; published by the University of Pennsylvania Press and supplied by IRON TRADE REVIEW for $1.50, plus 15 cents for postage, and in Europe by Penton Publishing Co. Ltd., Caxton House, London, S.W.1 for 7s 6d, net.

The authors, both from the industrial research department of the University of Pennsylvania, have sought to show the significance of changes in the trend of foundry production in the Philadelphia district. As a fundamental part of all industry this is considered important in indicating general trends in industry.

Despite the wide use of foundry products and the fact that foundry output is of interest to industry in general as well as to foundrymen and students of business conditions, no general index of foundry production is available and the authors believe theirs is the first study of identical gray iron foundries in any area.

It is a valuable study from which ultimate useful information may be expected as it is expanded in later issues, especially when combined with similar studies in adjacent fields.

* * *

A Corporation with a Soul

Forty Years with General Electric, by John T. Broderick; cloth, 220 pages 5 x 7½ inches; published by Fort Orange Press, Albany, N. Y., and supplied by IRON TRADE REVIEW for $2.50, plus 15 cents for postage, and in Europe by Penton Publishing Co. Ltd., Caxton House, London, S. W. 1, for 7s 6d, net.

While historical in form this volume is less history than a series of first-hand sketches of historical importance. It describes the origin and growth of the General Electric Co. and traces its success to the spirit of its founders.

Sketches of Steinmetz, Coffin, Rice, Whitney, Langmuir and Elihu Thomson reflect their characteristics as seen by an associate of four decades. Incidentally the story touches many of the high points of the development of the electrical industry since 1880.

The author is a native of Oswego, N. Y., and was a newspaper and magazine writer previous to becoming affiliated with General Electric in 1889.

* * *

All Phases of Pickling

Pickling of Iron and Steel, by Wallace G. Imhoff; cloth, 195 pages; 6 x 9 inches; published by the Penton Publishing Co., Cleveland and supplied by IRON TRADE REVIEW for $5.00, plus 15 cents for postage, and in Europe by the Penton Publishing Co., Caxton House, Westminster, London, S.W.1. for 26 shillings net.

This book, which ran serially in IRON TRADE REVIEW from Oct. 27, 1927 to Dec. 20, 1928, covers many phases of pickling room practice and construction and maintenance of pick-

ling equipment. It is written in a manner that will appeal to practical picklers in the sheet, tin plate, strip, pipe, wire, seamless tube, enameling, foundry, hollow ware, galvanizing and lead-coating industries. The author, Wallace G. Imhoff, was for five years industrial fellow, investigating pickling and galvanizing at Mellon Institute of Industrial Research, University of Pittsburgh, Pittsburgh.

The scope of the work may be inferred from the 15 chapter headings which include: Facts About the Steel and Iron Base and Iron Oxides and Scale; Acids, Bath Temperature and Pickling Time; Steam, Air and Agitation; Solutions, Tanks and Contaminations; Equipment and Production Principles; Compounds and Inhibitors; Fumes, Ventilation and By-Products; Chemistry of Pickling; Design and Construction of Pickling Tanks; Design of Pickling Departments; Pickling Steel and Copper for Tinning; and, Pickling for Zinc and Lead-Coated Sheets.

Much of the text is based on practical experience obtained in plant pickling departments, and information compiled after interviewing practical picklers, foremen, superintendents, managers and others interested in the subject. The book is intended for the man in the plant rather than for the man in the laboratory although it should appeal to men in both fields. In addition to 46 illustrations, a detailed list of contents and a cross index of over 575 items, the text includes a 35-page bibliography of pickling articles and books.

* * *

Proposed Standards Set Forth

A. S. T. M. Standards for 1929, paper or cloth, 901 pages, 6 x 9 inches; published by American Society for Testing Materials and supplied by IRON TRADE REVIEW for $7 in paper and $8 in cloth, plus 15 cents for postage, and in Europe by Penton Publishing Co. Ltd., Caxton House, London, S. W. 1, for 35s and 40s, net, respectively.

Proposed standards not yet adopted are covered in this annual publication. It presents 173 tentative standards, which are on trial before the various branches of industry for consideration and amendment before being finally adopted. Of these, 24 relate to ferrous metals, 10 to nonferrous metals 38 to protective coatings and petroleum products and 22 to coal and coke and miscellaneous materials.

Publication is for the purpose of presenting the present status of the proposed standards, to invite suggestions and criticisms which may be further considered.

Year's Crane Business Passes 1928 Mark

Sales and shipments of overhead electric crane equipment were much larger during 1929 than in the preceding year. During the first 11 months of the year the value of new orders was more than $6,000,000 ahead of the entire 12 months of 1928. The value of shipments during 11 months, 1929, was nearly $4,000,000 ahead of the entire previous year.

Units ordered and tonnage capacity also materially increased. There was a tendency toward buying equipment with heavier tonnage capacity and with correspondingly higher value. New orders in 1928 totaled 1077 cranes. With one month for 1929 to be reported by the Electric Overhead Crane institute, sales in 1929 for 11 months were 1608 units. Shipments during 11 months, 1929, were 1417 against 1024 for all of 1928.

Unfilled orders on Dec. 1 totaled 414 units with a tonnage capacity of 7496½ valued at $4,932,504.13. Unfilled orders on Dec. 1, 1928, totaled 266 units valued at $2,189,395.54.

Shipments and new orders declined during November, according to the institute, totaling 13 units with a tonnage capacity of 1539 valued at $1,162,204.50, compared with 152 units with a tonnage capacity of 1755½ valued at $1,322,118.30 in October. Tonnage capacity of new and unfilled orders was higher, however. New orders comprised 132 units with a tonnage capacity of 2048¼ valued at $1,404,994.45; unfilled orders Dec. 1 totaled 414 with a tonnage capacity of 7496¼, compared with 416 unfilled orders on Nov. 1, their capacity reaching 7009 tons.

Crane manufacturers are entering the new year with much heavier orders on the books. March was the banner month for new orders, 199, while October led in shipments, 152. With the exception of September, values of orders every month of 1929 led the corresponding month of 1928. Dollar values were highest for new orders and shipments in March and October, respectively. The accompanying table gives comparisons for 11 months of 1929, and the entire year 1928.

Overhead Crane Orders and Shipments

	New orders				Shipments			
	1928		1929		1928		1929	
	Units	Value	Units	Value	Units	Value	Units	Value
Jan.	74	$357,671.18	173	$1,383,257.70	75	$431,563.67	107	$851,514.34
Feb.	69	518,776.25	149	1,172,850.60	77	594,896.55	97	585,986.10
March	102	704,135.50	199	1,918,720.40	87	671,916.40	113	772,609.10
April	74	410,499.50	149	1,193,647.85	92	658,752.21	107	748,367.40
May	93	708,144.92	181	1,456,541.80	94	546,467.00	134	1,122,014.90
June	94	573,264.44	152	1,189,046.86	77	599,612.00	150	1,091,228.20
July	80	732,792.80	126	1,156,843.45	87	463,104.80	145	1,146,264.00
Aug.	108	821,182.20	124	1,164,989.95	84	563,721.86	140	1,059,946.66
Sept.	91	713,220.60	89	700,972.50	63	464,147.00	141	1,048,054.10
Oct.	108	774,709.10	134	1,142,216.00	99	806,469.58	152	1,322,118.30
Nov.	110	725,372.34	132	1,404,994.45	97	701,007.00	131	1,162,204.50
Dec.	74	558,653.00	.....	.....	92	662,821.10	.....	.....
Total	1077	7,598,421.83	*1608	*13,884,081.56	1024	7,164,479.17	*1417	*10,910,397.60

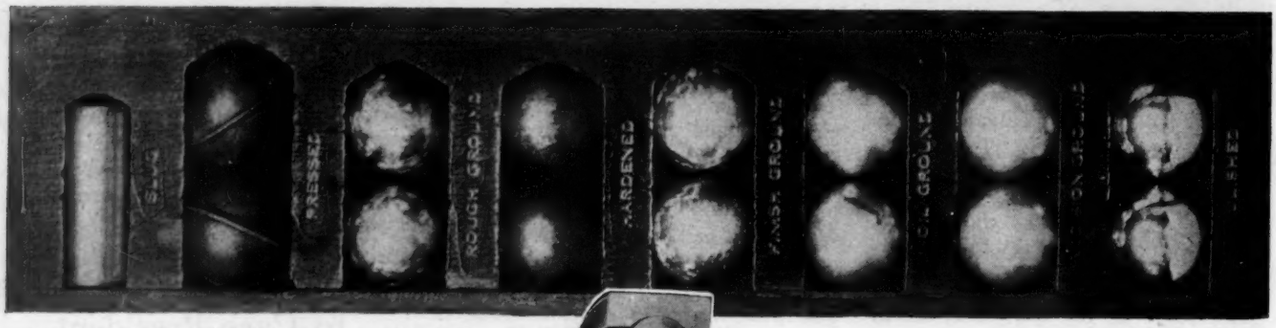
*Eleven months.

Engineers Give Welcome to Case President

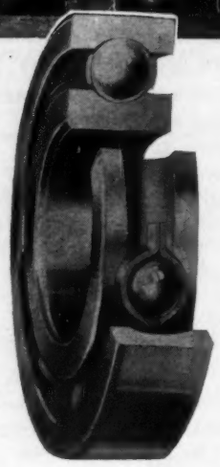
Dr. William E. Wickenden, recently installed president of Case School of Applied Science, was welcomed into active engineering educational work in Cleveland, when on Dec. 16, about 600 members of the Cleveland Engineering society and the local section of the American Society of Mechanical Engineers honored him at a banquet at Hotel Winton.

Dr. Wickenden in addressing the meeting on the subject of "Training Engineers for Positions of Responsibility," said, "We must realize that we are training not a body of competent technicians, but the architects of a new civilization." He pointed out the unusual opportunities that await the graduate engineer, and stated that one job in every 50 needs technically trained men. He said further, "It is time for the engineer to throw off the poverty complex, and inferiority complex and assume his place in the industry." Dr. Wickenden pointed out the importance of this place, and the importance to society of the engineering profession.

Ambrose Swasey, vice chairman of the board, Warner & Swasey Co., Cleveland, and a member of the Case corporation, gave Dr. Wickenden a hearty and earnest welcome. Burton D. Quarrie, president, Oliver Iron & Steel Co., Pittsburgh, officiated as toastmaster and introduced Dr. Wickenden as a "scholar, engineer and business man—a great combination."



Evolution of steel ball, left to right: The slug, pressed, rough ground, hardened, finish ground, oil ground, precision ground and polished



Large Uses of Steel in Small Ways

156th Article — Ball Bearings

THE headline under which this series of articles has been appearing since Nov. 22, 1923, "Large Uses of Steel in Small Ways," seems especially appropriate for the subject of ball bearings. Ball bearings are relatively small, a large tonnage of steel is used in their manufacture, and they perform a great service for mankind. By their use friction is reduced in more than a mechanical sense; they make possible thousands of comforts and labor-saving conveniences in the home, on the road, in offices and factories.

Even-Tempered Workmen

A manufacturer of household appliances who had just returned from Sweden told of an experience which greatly impressed him as an instance of the human element in industry. He said that he had visited a plant where steel balls were made, and in one department he was informed the workers were especially selected for their evenness of temper. Irritability in men increases their body temperature and contact would transmit enough heat to balls to expand them so they would not pass their proper gages. He was much impressed until he learned that some American manufacturers take extreme care to insure the accuracy of balls. Here, as in Sweden, they are made in automatic machines, and graded automatically. In the testing rooms in this country the balls are handled with tweezers. In the final assembly, requiring human touch, only persons with neutral perspiration are permitted to work, as an acid or alkaline moisture would produce "rust spots" on the balls and mar the smooth finish.

Steel balls ½-inch in diameter are made to withstand a crushing test of 25,000 pounds, and those of 1-inch diameter, 90,000 pounds. Yet the balls are so uniform that in an order for a specific size, the total variation in diameter would not exceed 0.0001-inch. A rough spot on a ball invisible to the eye might cause it to exceed the allowable variation; lead to its rejection, and what would be worse, cast doubt on others made by the manufacturer. Of course, it is not necessary that all steel balls be perfect spheres. They are used in children's roller skates, bicycles, factory building ventilators and elevator doors, to mention only a few instances where extreme accuracy is not essential. The balls so used, however, generally are made in the same way as the others, and therefore possess a surplus degree of perfection.

Balls Are Chrome Alloyed

Manufacturers of ball bearings in the United States consume approximately 100,000 tons of steel annually, according to an estimate by one of the leading producers. The steel used for the balls and races generally is the same, a high carbon chrome alloy, with carbon about 1 per cent and chromium 1.4 per cent. The retainer, which serves to keep the balls in place and equally spaced in the races, is made of a soft, low carbon steel.

Some balls are made of stainless steel, monel metal and bronze, to meet special atmospheric conditions, or for use in corrosive liquids. Balls sometimes are made of bakelite and other nonmetallic materials, and then pierced, to become beads for necklaces. The latter, however, merely indicates the adaptability of some of the specialized grinding and polishing equipment.

Wide Variation in Sizes

The smallest diameter of steel balls for ordinary commercial purposes is 1/16-inch, and the largest about 2½ inches. Steel balls are made for special uses as small as 1/32-inch diameter, and in some instances larger than 2½ inches.

The two principal methods of making balls are by hot forging and cold pressing, though some are turned out of solid stock. Generally, those up to ¾-inch diameter are cold pressed, and those larger are hot forged. In these two methods rods are fed into an automatic machine, slugs are cut from the rods and the slugs pressed into the form of a ball. The above illustration shows the balls in various stages of manufacture. Reading

from left to right: The slug, pressed, rough ground, hardened, finish ground, oil ground, precision ground and polished.

The grinding operations are similar to one another, being accomplished by two wheels pressing against the ball, the wheels running in opposite directions and imparting a swirling motion to the ball, which is held in position in a V-shaped ring. High-grade balls are heat treated throughout, not merely case hardened. They are given a final polish in a tumbling barrel, the polishing medium being leather chips, sawdust and lime water.

The balls are graded in much the same manner as California and Florida fruitgrowers grade their oranges, by running them out in a channel, wider at one end than at the other, the balls dropping into compartments. More than 98 per cent of the balls come through within the allowable limits for accuracy in their respective sizes. Less than 2 per cent are rejected for surface defects, out-of-tolerance, or other faults.

Ball bearings are of two general types, radial, where the load is carried at right angles to the bearing, and thrust bearings, which carry the load parallel to the bearings. The shapes and sizes of the races vary to meet requirements. Standard radial bearings up to 6-inch diameter generally are turned out of solid bar stock, thus the outer and inner races being obtained from one piece. Larger races are forged.

Welding Society Issues Code of Definitions

Following preparations extending over the past three years, the American Welding society has published a booklet of nomenclature, definitions and symbols for welding and cutting, which because of its fundamental and comprehensive nature represents one of the most valuable accomplishments of the society to date. The tremendous increase in the use of welding and cutting has created a need for such a code because of the diversified terminology of various authors and the general lack of standardization.

The text, including an index, consists of 43 pages, and is illustrated with numerous sketches. It is divided into four sections. Section I covers nomenclature under which the names of the principal welding processes are given in full, and there is a schematic diagram of the principal welding processes illustrating their inter-relation. Section II gives definitions of general welding terms, processes, forms of joints, forms of welds and equipment and supplies. Section III gives abbreviations, and Section IV presents symbols for use in connection with the resistance and fusion welding processes.

The committee which was in charge of this work comprised authorities on the various welding processes and a representative of the bureau of standards. Its personnel was as follows: Chairman, James W. Owens, director of welding, Newport News Shipbuilding & Dry Dock Co., Newport News, Va.; A. M. Candy, arc welding engineering department, Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.; J. J. Crowe, research engineer, Air Reduction Sales Co., New York; J. H. Deppeler, chief engineer, Metal & Thermit Corp., New York; W. B. Miller, metallurgist, Union Carbide and Carbon Research Laboratories Inc., Long Island City, N. Y.; H. H. Moss, engineering development department, Linde Air Products Co., New York; W. L. Warner, welding department, General Electric Co., Schenectady, N. Y.; H. L. Whittemore, materials engineer, bureau of standards, Washington, and H. A. Woofter, vice president and general manager, Swift Electric Welder Co., Detroit.

The code was published as a supplement to the society's *Journal* for November, but additional copies can be obtained from the American Welding society, 33 West Thirty-ninth street, New York, for 50 cents each.

Steel Founders Anticipating Good Business During 1930 First Half

OPTIMISTIC reports for steel foundry business for the first six months in 1930 featured the meeting of the Steel Founders' Society of America held Dec. 12 at the William Penn hotel, Pittsburgh. Fully 90 per cent of the members attending the meeting believed that business will be good during the first half of the year. Railroad buying is good and demand for steel mill equipment is excellent. Some slump has been noted in the demand for road building equipment, but it is thought that business in this field will be better in 1930 than in several previous years.

The morning session was devoted to the survey of the business situation and the report of Granville P. Rogers, managing director of the society. Mr. Rogers stated that the society recently had been incorporated under the laws of the state of New York. A tentative draft of a set of trade customs has been sent to the research committee for its consideration. It is possible that the committee will have a set of standard trade customs ready to submit to the board at the next meeting, which will be held in Chicago, Jan. 28. The committee will give special attention to the permissible variation in the weight of the casting and to a standard sales agreement. Consideration also will be given to the benefits of one set of uniform trade customs for all branches of the industry.

Postpone Trade Practice Code

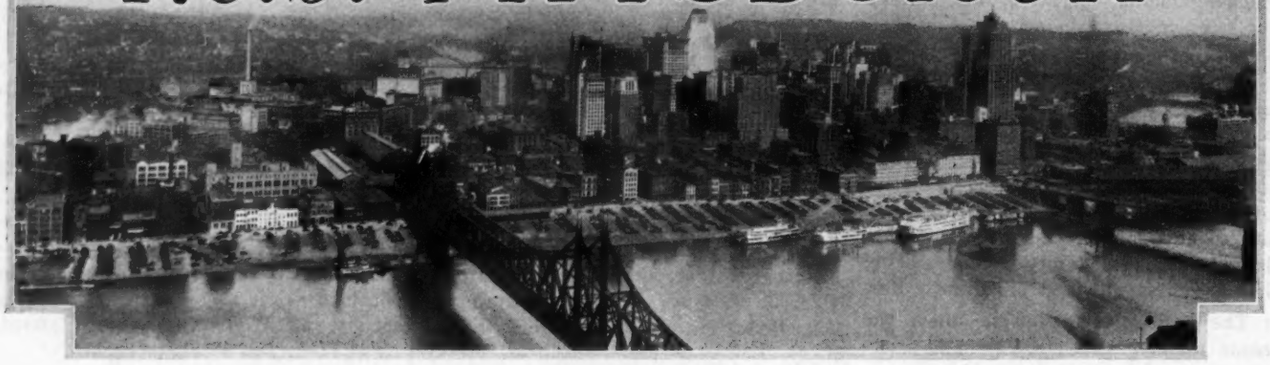
It has been decided not to set up a code of fair trade practices at this time but to recommend the settlement of all disputes that may arise through the American Arbitration association. The society indorsed the principle of arbitration for the settlement of business disputes and authorized the managing director to seek the co-operation of the arbitration association. It was announced that six companies have been accorded membership in the society since the Chicago meeting. It was recommended that a special section be set up within the society for manufacturers of heat, acid and corrosion-resisting alloy steel castings.

Wealth Lies in Personnel

Immediately following a luncheon for members and guests, George Batty, research director, Steel Castings Development bureau, Philadelphia, delivered an address on "Undeveloped Wealth in the Steel Foundry." Mr. Batty believes that the greatest sources for undeveloped wealth lie in the personnel, the superintendents and foremen. He pointed to the limitations now placed upon the superintendents in the drive for production at a set cost, and suggested the employment of a technician, a man with technical training and practical experience, to correlate and translate the observations of the superintendends and foremen with determinations arrived at by scientists.

Meetings of the large castings division and the small castings division followed the general meeting. Both of these sessions were devoted to the discussion of operating data reports for the last period, as well as other problems pertaining to the particular branch of the industry.

F.o.b. PITTSBURGH



Heavy Equipment Builders Still Busy as Year Ends

* * * * * * * * *

Plane and Auto Parts Manufacture Looms Large

Pittsburgh, Dec. 17

OPERATIONS of the larger steel foundries in the Pittsburgh district are running counter to the trend in steel ingot production and rolling mill schedules. Good activity in railroad equipment and in heavy mill machinery is enabling foundries to hold their output at better than the usual seasonal rate. This applies only to the machinery itself, however, since demand for rolls follows the activity in the steel industry and at present is off considerably from the volume of earlier months of the year.

The heavy equipment builders, such as Mesta Machine Co., Mackintosh-Hemphill Co. and United Engineering & Foundry Co., are closing a busy year. Net earnings of the Mesta company for the first six months nearly equaled the profits for all 1928 and were more than 10 per cent ahead of the 12-month average for the four preceding years. Profits of United Engineering are announced only once a year, but estimates for 1929 place the net per common share at around $4 a share, compared with $1.72 which each share of common stock earned in 1928.

Order books still are in good condition and the outlook for 1930 is regarded as favorable, even though the volume of the current year may not be exceeded. Current backlogs of machinery extended as far as six months, considerably better than a year ago. Recent declarations by steel executives that proposed construction programs will be carried out are regarded as encouraging factors to continued activity.

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SUSTAINED buying of freight cars has provided local builders with good operations during the year, and backlogs are sufficient to provide substantial schedules well into the first quarter. Production of railroad castings has been at a corresponding pace. Union Steel Casting Co., a Blaw-Knox Co. subsidiary, recently increased its output from 1100 to 2500 tons monthly and announced it would step this up to 3000 tons within the next five to six weeks. American Steel Foundries continues operations at its Verona, Pa., plant, which was started up in March following an extended idleness.

Good schedules of steel foundries have provided a rather unusual situation in steel scrap prices. Railroad car knuckles, couplers, springs and wheels—commonly called railroad steel specialties—ordinarily sell about $2 a ton above the price of heavy melting steel. The law of supply and demand takes precedence in such instances, however, and the good demand for this material by steel foundries and limited offerings by railroads enabled these grades to oppose the downward trend in prices of the general scrap list. The spread between heavy melting steel and specialties, consequently, widened recently to around $5 a ton.

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WHEN the Mackintosh-Hemphill Co. recently moved its general offices and engineering department from the foot of Twelfth street to the Point building it concluded an occupancy of one location that had extended over 70 years. The old property was purchased by the Pennsylvania railroad for improvement work. In 1859 this site was acquired by James Hemphill, Dr. W. S. Mackintosh and N. F. Hart, and out of the small shop located there grew the present organization. The Mackintosh company in 1922 took over the A. Garrison Foundry Co., and the Pittsburgh Iron & Steel Foundries Co.—firms which, like the parent company, are rich in industrial history, particularly that of the development of the iron and steel industry.

The A. Garrison Foundry Co., until 1865, was known as the Pittsburgh Foundry. The latter was founded by Joseph McClurg in 1803 and was the first foundry in Pittsburgh. The Fort Pitt Works, established in 1815 by McClurg and his son, Alexander, was acquired by James Hemphill and his partners in 1878. Both of these plants occupy a prominent position in history. The Pittsburgh Foundry furnished cannon balls for Commodore Perry's fleet in 1812. Civil war ordnance was made at all of the Mackintosh plants. The first locomotive built west of the Alleghenies was a product of the Fort Pitt Works.

That the establishment of a foundry as early as 1803 was attended by some uncertainty as to its future prosperity is indicated by the discouragement given Mr. McClurg by his friends and also by the former's early advertisements which appended the announcement of operation of an "air"

foundry with the statement that "he also continues to carry on the manufacture of tobacco", and that "he has likewise on hand a handsome & general assortment of goods, also a large and general assortment of new Geneva window and hollow glass."

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PLANS for the production of an American edition of the Austin automobile, successful English motor vehicle, are going forward and actual assembly is expected to be under way in February or March. Work now is in progress at Butler, Pa., in preparing for occupancy the plant purchased from the Standard Steel Car Co. Operations at Butler are expected to be largely of an assembly nature, with both the bodies and motors purchased at the start. An output of 500 cars daily is scheduled for spring. Headquarters of the American Austin Car Co., now located in Detroit, will be moved to this district when operations are commenced.

The Austin car is not to be confused with the diminutive Martin automobile, announcement of which recently commanded considerable attention by its small size which permits its packing case to serve as a garage. The Butler product will be the smallest domestic automobile planned for commercial production in the immediate future, however, and will have claims as to low initial cost and economical operation. Over all length will be 9 feet 2 inches, and width 3 feet 10 inches. Fuel consumption, it is said, will be better than 40 miles per gallon.

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PROPERTY purchased by the Austin company from Standard Steel Car Co. comprises 13 acres and six buildings and is the site of a former venture in the automotive industry which, however, proved unsuccessful. The plant was erected early in the World war to make shells for the English government. In 1916 the Standard Automobile Co., a subsidiary of the Standard Steel Car Co., occupied the property and commenced production of the Standard automobile, a large 8-cylinder model. The company discontinued business in 1922.

Despite its production of a large portion of the steel and glass entering into the building of automobiles, the Pittsburgh district has not proved a fertile field for the location of motor car plants. Refusal of the city to grant a plot of land and $30,000 is said to have been all that prevented the Ford Motor Co. from locating its headquarters in Pittsburgh. Today the local Ford assembly branch is larger than the company's original plant. Several automotive parts makers have enjoyed success, however, including the Witherow Steel Corp. and the Standard Steel Spring Co.

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IN THE aviation industry several Pittsburgh concerns have made notable progress. Both the Standard Hamilton Propeller Co., formerly the Standard Steel Propeller Co., and the Westinghouse Electric & Mfg. Co. have been producing airplane propellers for a number of years, the Standard product being an aluminum forging and the Westinghouse propeller being micarta. The Pittsburgh Screw & Bolt Corp. is preparing to start commercial production of its hollow alloy-steel propeller, The Aluminum Co. of America has been active in the development and production of aluminum alloys for use in airplane construction. The Pittsburgh Aviation Industries Corp., through a subsidiary company, is planning to engage in the commercial production of all-metal planes and recently completed one successful model. The Edgewater Steel Co. makes shock absorbers for airplane landing gear.

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RETAIL business in Pittsburgh to Nov. 1 this year has reflected the steady employment in the steel industry over the larger portion of that period and shows a gain over the comparable 1928 period. October figures refute the impression that general business was declining that month, sales here being 8.4 per cent better than in October 1928. Of 49 cities, only Boston and Omaha showed larger gains than did Pittsburgh. Increases reported by other cities included 7.8 per cent for Akron, O., 0.8 per cent for Cincinnati, 6 per cent for Cleveland, 2.8 per cent for Columbus, O., 3.7 per cent for Dayton, O., and 5.8 per cent for Toledo, O.

The part that iron and steel plays in the general prosperity of Pittsburgh is indicated by the fact that 64 per cent of wage earners and salaried men in Allegheny county are engaged in the metals industry and receive 67 per cent of total salaries and wages. Of this 64 per cent, 41 per cent are occupied in the secondary production and 23 per cent in the primary production of metals. A recent survey by the *Editor and Publisher*, New York, states that department store sales, per capita, in Allegheny county are almost double those of any other city in the world—an interesting report but hardly indicative that steel enjoys a similar prosperity.

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EIGHTY years ago a cast iron fence, 200 feet long, was erected in front of the new Christ Church of Brownsville, Pa. Brownsville is on the Monongahela river 40 miles south of Pittsburgh and years ago, because of its additional location on the National pike, was regarded as one of the leading communities of western Pennsylvania. This fence has defied the elements over the past four score years and it was only recently, when a motor truck broke through several sections, that repairs were necessary and attention was directed to its longevity. The Reliance Steel Casting Co. has cast new sections to replace the damaged ones, making steel castings for the sake of convenience.

Three generations have participated in the erection and preservation of the fence. C. L. Snowdon Jr., secretary of the Reliance company, is a grandson of the John Snowdon of John Snowdon & Sons, which provided the original barrier. The latter concern formerly enjoyed an active business at Brownsville, making castings and equipment for river boats. Some of the cast iron mile markers made by this company nearly 100 years ago for the National pike still may be seen along the highway.

* * *

PRICES of steel securities not listed on exchanges have depreciated in proportion to the decline in the more active stocks since the sharp break in October and early November. Weirton Steel Co. common, which sold earlier this year over the counter as high as 600, now is offered at 325. Jones & Laughlin Steel Corp. common, also closely held, was offered at 420 prior to the market collapse and now is available at 325.

Practically all of the steel stocks listed on the Pittsburgh exchange currently are selling only a few points from lowest levels of the year, despite uniformly good earnings, and have failed to show the moderate strengthening recorded by steel securities on the New York exchange. Allegheny Steel Co. common at 60 is off 30 points from the year's high and compares with the low of 59. Copperweld Steel around 50 compares with a high of 80 and low of 42. Vanadium-Alloys Steel has dropped from 82 to 65. Witherow Steel is selling about 40 points from the high of 80 and 10 points above the low.

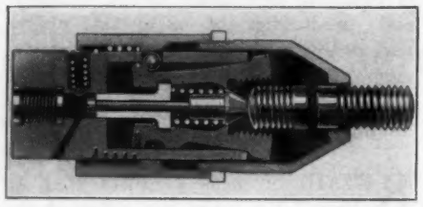
Sheet & Tube Licensed

The Youngstown Sheet & Tube Co., Youngstown, O., has been licensed by the American Rolling Mill Co., Middletown, O., to use the latter's continuous sheet rolling process. Other licensees include the United States Steel Corp., Weirton Steel Corp., Wheeling Steel Corp., Republic Iron & Steel Co., Gulf States Steel Co. and Otis Steel Co.

Power Stud Setter Has Quick Release

No. 268

Titan Tool Co., Erie, Pa., recently has placed on the market a quick release stud setter, of the self-opening type, for driving stud bolts. It is a power driven unit adaptable to drill presses and both portable and stationary electric drills. The tool will work efficiently at either high or low speeds and at any angle. The drive is positive and releases automatically when the stud has been driven to a predetermined height. In operation the tool may be registered or loaded by clamping onto studs previously started in their seats by hand or by inserting studs in the tool which will hold them ready for driving into the seats. The positive drive is released when the gage sleeve pushes back the slip ring, which in turn releases hardened steel driving balls. These balls move outwardly into a recess provided in the slip ring.

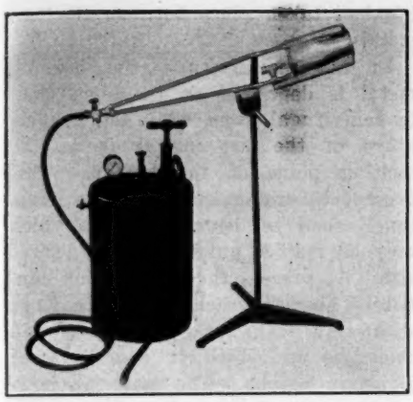


No. 268—Quick-release stud setter

At this stage the driving jaws remain in complete register with the stud and to further complete the cycle of operation it is necessary only to lift or pull the tool away from the stud. This is done with freedom from the driving force, insuring the studs against mutilated threads. As the tool frees from the stud the slip ring acts on the driving balls forcing them into a driving position. The jaws come out into an open position and the unit is ready to register on and drive another stud. The jaws are arranged in the tool body in such a manner as to fit closely over the stud even where the studs may vary as much as 0.015 inch in pitch diameter. Studs as short as ½ inch may be seated successfully with this tool. It is made in two sizes having maximum

Iron Trade Review's Calendar of New Equipment

Item	Comment	Builder	No.	Date Described	Page
Vise	Back jaw may be swiveled; built with steel slide	Simplex Tool Co.	247	Nov. 21	1318
Bucket	Grab bucket of welded construction; ½-yard capacity	Edgar E. Brosius Inc.	248	Nov. 21	1318
Grinder	Cutter grinder; table may be swiveled	Cincinnati Milling Machine Co.	249	Nov. 21	1319
Sander	High-frequency portable sander for light work	Porter-Cable Machine Co.	250	Nov. 21	1319
Starter	Counter E. M. F. automatic type for small motors	Cutler-Hammer Inc.	251	Nov. 21	1319
Stapling machine	Drives staples in barrel or keg heads	E. H. Titchener & Co.	252	Nov. 21	1320
Grinder	For high-speed snagging; new power transmission	United States Electrical Tool Co.	253	Nov. 21	1320
Chain	Roller chain for heavy-duty applications; 2½-inch pitch	Diamond Chain & Mfg. Co.	254	Nov. 28	1382
Meter	Detachable watthour meter in weatherproof case	Westinghouse Electric & Mfg. Co.	255	Nov. 28	1382
Control	Automatic idling device for gasoline driven arc welders	Lincoln Electric Co.	256	Nov. 28	1382
Lathe	Universal turret type; special turret clamp	Gisholt Machine Co.	257	Nov. 28	1383
Grinders	Single-speed and multiple speed heavy-duty units	Hisey-Wolf Machine Co.	258	Nov. 28	1383
Hoist	Steel erectors' hoist; special safety brakes	Lidgerwood Mfg. Co.	259	Nov. 28	1384
Crane	Locomotive crane; 25-ton diesel-powered	Industrial Brownhoist Corp.	260	Dec. 5	1452
Lathe	Adaptation of copying lathe; turns airplane propellers	Defiance Machine Works	261	Dec. 5	1452
Mounting	Method of mounting tungsten carbide metal in tool shank	Advance Diamond Tool Co.	262	Dec. 5	1452
Motor	Single phase, squirrel-cage capacitor type; quiet	General Electric Co.	263	Dec. 5	1452
Wrench	Rotary pneumatic; useful in boiler assembly, etc.	Independent Pneumatic Tool Co.	264	Dec. 5	1453
Hopper	Floor-level type; attached to centerless grinder	Cincinnati Grinders Inc.	265	Dec. 5	1453
Milling machines	Equipped with power quick traverse in six directions	Cincinnati Milling Machine Co.	266	Dec. 5	1453
Grinder	For brake drums; swings work up to 26-inch diameter	Cincinnati Grinders Inc.	267	Dec. 5	1454
Stud setter	Power operated; self-opening with quick release	Titan Tool Co.	268	Dec. 19	1570
Burner	Kerosene; for preheating in welding operations	St. Paul Welding & Mfg. Co.	269	Dec. 19	1571
Shear	Heavy-duty mill squaring shear; several improvements	Niagara Machine & Tool Works	270	Dec. 19	1571
Controller	Triple-drum type for floor operation of cranes	General Electric Co.	271	Dec. 19	1571
Breaker	Meter service breaker; has no fuses	Square D Co.	272	Dec. 19	1571
Hammers	Pneumatic chipping hammers; short overall lengths	Ingersoll-Rand Co.	273	Dec. 19	1572
Bearing	Bi-metal type with seamless steel tube backing	Fredericksen Co.	274	Dec. 19	1572
Contact cable	Pressure on cable at any point closes circuit	Bishop Wire & Cable Corp.	275	Dec. 19	1572



No. 269—Kerosene burner and fuel tank with pressure pump

capacities of ½-inch and ⅞-inch studs. The accompanying illustration shows a section view through the center of the tool along the long axis.

Designs Kerosene Burner for Preheating Work

No. 269

St. Paul Welding & Mfg. Co., 174 West Third street, St. Paul, is placing on the market a new type of kerosene burner for preheating in connection with welding and for all kinds of heating where a large flame is required. The torch of the burner throws a flame approximately two feet in length and burns 1½ gallons of kerosene per hour. The double-acting pump, integral with the fuel tank, is designed to draw in either air or kerosene. Fuel may be replenished while the torch is in operation. The entire outfit is portable and may be used inside or outside the shop. As shown in the accompanying illustration, the burner unit consists of torch, 10-gallon tank with pump, 10 feet of oil hose and torch stand.

Belt or Motor Drive on Squaring Shear

No. 270

Niagara Machine & Tool Works, 637 Northland avenue, Buffalo, has announced a number of improvements on its line of heavy-duty mill squaring shears, constructed in a capacity range from ½-inch to ¾-inch mild steel plate and built in lengths from 60 inches to 192 inches. The main eccentric shaft is of hammer-forged steel of large diameter turned and ground, the eccentrics being forged solid with the shaft. Main bearings of the housings and center bearings lie immediately adjacent on either side of the eccentrics and hold-down cams. Closeness of the supporting bearings is said to stop vibration, resist deflection and minimize bending stresses. The two end bearings are solid sleeves fitted into the housings, quickly and easily removed when worn.

Spring Foot Hold-Down a Feature

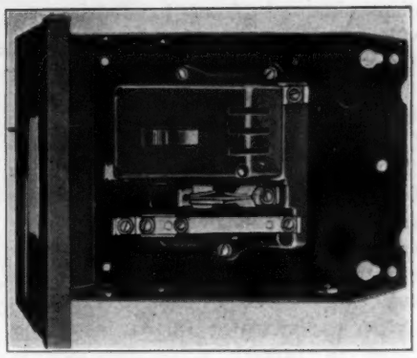
An individual spring foot hold-down has been incorporated in the design. It is operated by two cams located on the mainshaft. Toggle links transmit the hold-down pressure stresses directly to the housings, relieving the cams, mainshaft and mainshaft bearings of excessive vertical stresses. Each foot has an individual spring cushion, making it self-adjusting for short and long plates and for different thickness of material. The crosshead, carrying the upper knife is of box section, massive and deep, and counterbalanced by means of two pneumatic cylinders mounted on the crown. Provision is made for counterbalancing by weights or springs where air is not available.

The lower knife chuck is of box construction also, adjustable from front to back for the setting of the knives. The knife chuck rests on a heavily ribbed bed, supported on ledges and bolted to the housings. Shears are double geared and either belted or geared motor drive can be furnished. The accompanying illustration shows the belted motor drive.

Triple Drum Controller Is Self-Contained

No. 271

General Electric Co., Schenectady, N. Y., announces a new self-contained triple drum controller with a resistor mounted on the back, for floor operation of the three motions of small low-head cranes. The general construction is similar to that of the standard controllers made by the company, with rope wheel having spring return, vertical and horizontal handle, all interchangeable. The horizontal handle arrangement is provided in case it is desired to install the controller in a crane cab for the usual method of manual operation. In such an installation the resistor can be separated from the drum switches, a necessary contingent if all three motors are rated at the full 10-horsepower rating of the controllers.

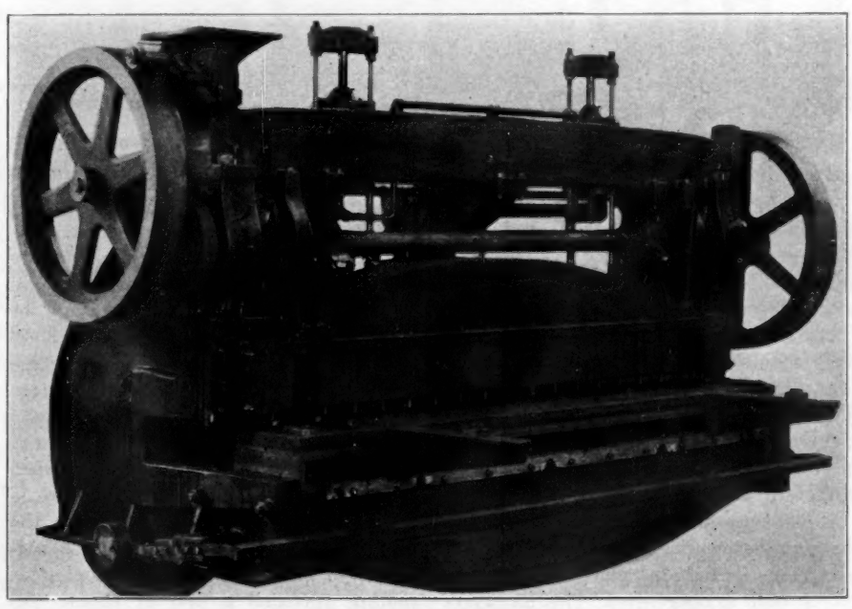


No. 272—Meter service breaker

Meter Service Breaker Requires No Fuses

No. 272

Square D Co., Detroit, announces the development of a meter service breaker for replacing fuses on electrical circuits of the 30-ampere, 125-volt, 2-wire, solid neutral service type. The absence of fuses in the breaker does away with problems of sealed main fuses, accessible fuses, interlocking



No. 270—Heavy-duty mill squaring shears arranged for belted motor drive

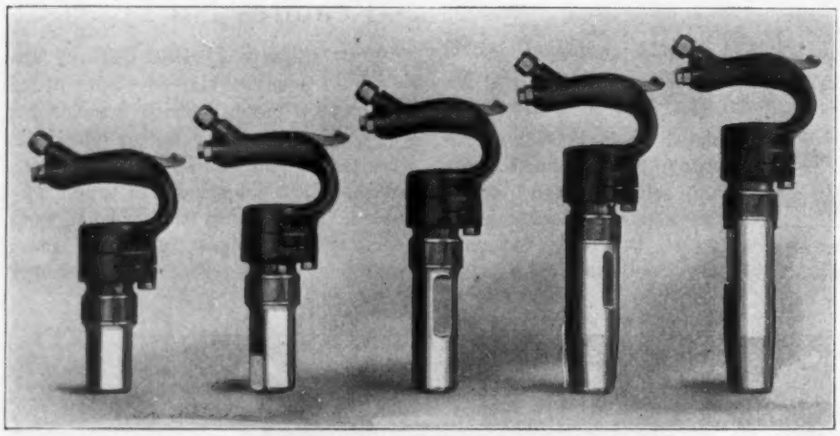
doors, etc. A front handle is provided, fully insulated, with three positions for setting, "on," "off" and "tripped." The handle is toggle operated and is reset easily; it may be locked in the "off" position if desired. The box is of standard size, as may be seen from the accompanying illustration, provisions being made for ordinary meter trims and for banking troughs. Since access to the circuit breaking mechanism never is required it is sealed in an insulating cover to furnish protection against tampering and dirt. The breaker will withstand temporary overloads but will open the line before any damage can be done and quickly enough to protect rubber-covered wire under all overload conditions.

Chipping Hammers Have Flapper Valves

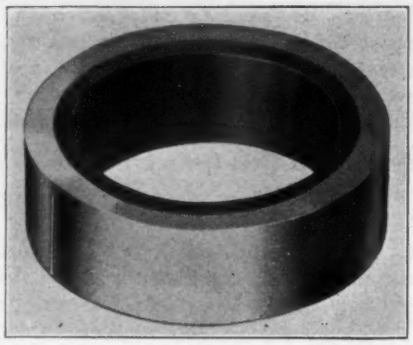
No. 273

Ingersoll-Rand Co., 11 Broadway, New York, is introducing a new line of high-speed pneumatic chipping hammers, an interesting feature in the design of which is the use of a plate valve of the flapper type. The flapper valve is a thin beveled plate which permits the hammers to be made in shorter overall lengths and also lighter in weight. The valve flaps down on its seat in the valve box to close the ports and rises to open them. This action is said to give quick and full opening and closing of the ports. The throttle valve is of a combination piston and poppet type. The exhaust deflector is flush with the barrel and permits turning the exhaust in the direction desired.

Open-type handles are standard. The handles screw on the barrels and are securely locked in place by a new pinch bolt arrangement. The hammers are furnished in five sizes, varying in stroke as follows: ¾-inch; 1-inch; 2-inch; 3-inch; and 4-inch. All are shown in the accompanying illustration. These five sizes are claimed to meet all conditions encountered in the various classes of chipping and calking work.



No. 273—Five sizes of pneumatic chipping hammers. Reduced length made possible by flapper plate valve



No. 274—Steel backed bi-metal bearing

New Bi-Metal Bearing Is Steel Backed

No. 274

Fredericksen Co., Saginaw, Mich., recently has developed a new bi-metal bearing consisting of an outer shell of seamless steel tubing to which an inner lining of bearing bronze is fused. The bearing bronze is a special bearing metal developed by the company and is composed of virgin copper, tin and lead, with a high percentage of lead alloyed by a process which is said to prevent segregation of the lead as well as seizing, scoring, burning, corroding, pounding out and other ills often ascribed to bronze bearings. Tests of the fusion between the steel and bronze have been made by bringing the entire bearing to the melting point of the bronze and allowing it to run out. Examination after cooling revealed a film of bronze adhering to the steel, showing that welding had taken place between the two metals.

In the manufacture, the bearing metal is deposited on the steel shell by centrifugal force, while the temperature of the two metals is at the melting point of the bronze. This process is said to produce a uniform inner shell of bearing metal which may be reamed quickly to the desired size. At present the construction cannot be applied practically to bearings with thin walls; the minimum wall thickness in which it can be used is about ⅛-inch. The material, however, can be furnished in lengths up to several feet and is made in all diameters up to 13 inches, inside.

Hand Pressure on Cable Closes Circuit

No. 275

Bishop Wire & Cable Corp., 420 East Twenty-fifth street New York, has designed a new and unusual control device known as a contact cable. It consists of a waterproof, dustproof and acidproof cable about the size of an ordinary lead pencil, which when compressed at any point in its entire length, closes the circuit between the two wires which it contains. Thus it may be used to actuate a switch, turn on lights, sound signals or operate relays to start motors in many diversified applications. In other words the cable is one continuous switch along its entire length.

Rubber Cushion Separates Wires

As to construction the cable has two conductors enclosed by the outside insulation. These conductors are left bare but separated from each other by an isolating cushion of rubber. When pressure is applied, by hand, foot or otherwise, this isolating cushion yields and permits the outer conductor to contact with another wire which in turn is always in contact with the inner conductor, thus closing the circuit. When pressure is released the isolation cushion returns the outer conductor to its normal position. The cable is used generally with light circuits, transformed to a maximum of 48 volts. Naturally if the cable is to be used to start motors or similar devices it must operate through a relay since the contact is broken as soon as pressure on the cable is released.

Neemes Foundry Inc., Troy, N. Y., has covered its employes by group life, health and non-occupational accident insurance, employer and employe sharing the cost. The benefit is $1000 for death and $15 per week for accident. The policy is written by the Metropolitan Life Insurance Co., New York.

Editorials

Standardizes Welding Definitions

WELDING and cutting as a method of metal fabrication is a comparatively new art. Once introduced, however, the process grew rapidly, in fact, more rapidly than agencies interested in its development could direct or control its progress. As a result, we have today a widely varying terminology and a serious lack of standardization. Much has been written on welding and authors have been free to coin definitions and terms as necessity demanded.

Most fortunate for the industry, the American Welding society came into existence in 1919 for the purpose of advancing the knowledge and art of welding and extending its applications. This organization has well fulfilled its mission and is exerting a wholesome influence. It has prepared or co-operated in the preparation of numerous codes for welds and procedure control. Early this year it announced the first authoritative structural steel welding code to be promulgated and at present has other codes under way.

Now the society has just completed a 48-page code of welding and cutting nomenclature, definitions and symbols. These standards have been under preparation for three years and because of their fundamental and comprehensive nature represent, perhaps, the society's most valuable accomplishment. This conscientious effort to promote standardization will do much to clear up existing confusion and should have a decidedly stimulating influence on the welding industry.

Metal Ingot Standard a Vital Need

NOT that it is so exceptional, but rather because it is analogous with conditions in many other industries, the perplexing situation with regard to specifications on copper alloys in ingot form, being unfolded by the special committee of the American Society for Testing Materials studying the subject, should command the attention of every producer and consumer of raw materials. Here is a situation so strikingly in need of correction that it provides convincing evidence of the need for vigilance in maintaining specification codes tuned to the tempo of business and industry.

Existing standards on copper alloys in ingot form apparently carry little weight. Limits are too wide, or too narrow, as the case may be, to assure the production of metal on anything approaching a uniform scale in the industry since the code is either too rigid, or too loose to make its application a matter of universal observance in the trade. For instance what today is accepted as 85-5-5-5 ingot may be any one of 40 separate mixtures coming within the range of limits accepted by both buyers and sellers. Obviously 85-5-5-5 mixture is a misnomer. Some idea of the confusion which must exist can be had from the fact that the investigating committee believes it is possible to reduce a total of 599 existing formulas on copper alloys in ingot form to between 30 and 40, it alone being possible to cut a total of 178 red brass formulas down to 2.

Adoption and rigid adherence to a standard specification code on composition ingots will go a long way toward eliminating certain practices which, though questionable, are entirely permissible by reason of the indifference to the present archaic code. No one can object to the adoption of rigid, but reasonable specifications except the unscrupulous or grasping producing interest which finds the present indifference of the consumer advantageous to it in the matter of quoting prices in competition with its more scrupulous and conscientious competitors.

Good Health in Steel Industry

IN ADDITION to having a comparatively low accident rate, as a result of years of intensive effort in the application of safety measures, the iron and steel industry has a low rate of sickness, according to a survey by the United States public health service. The accident frequency and severity rates as determined and compared by the bureau of labor statistics have been referred to in these columns from time to time.

The service reports that "a low sickness rate was found among employes in the iron and steel industry," lower than for two other main industrial groups, and "the rates were especially low for neurasthenia, the digestive diseases, bronchitis, influenza and grippe among steel workers." There were four disease groups, however, which showed a higher rate in steel than in other industries. These were pneumonia, the epidemic and endemic diseases, diseases of the heart, and "other" diseases of the nervous system. With the exception

of pneumonia, the service says, "these disease groups may not occur at significantly higher rates in steel than in other industries represented."

The service found that the abnormal frequency of pneumonia is confined to a relatively small number of occupations in the steel industry, and it is making observations now in co-operation with a large steel company to determine the cause of the predisposition. In general, the service gives the steel industry a commendable report.

See Further Growth in Pipe Lines

EVEN casual surveys of the oil and gas industries of the country indicate that next year will see further development of pipe line extensions. Super pipe line projects took tremendous tonnages of skelp and plate during 1929, and helped to press into service plate mill capacity in the Chicago district that had not been engaged since the war. A number of important undertakings, which will add to the more than 85,000 miles of natural gas lines already laid in the United States, are being proposed.

Among projected works are two large pipe lines for the transportation of gas from West Virginia fields to seaboard cities, including Philadelphia, Washington, York, Pa., and other points. Preliminary plans were announced some time ago for a large capacity line from the Amarillo gas fields of Texas to Chicago. Most of the larger oil companies, having reached a new viewpoint concerning natural gas operations, have gone into the natural gas business on an important scale, or are preparing to transport gas from their oil holdings. Public utility authorities point out that expansion of service by the natural gas companies is in embryo development. Possibilities for steel consumption by the oil and gas industries unquestionably offer much of encouragement for the next few years.

Five-Day Week Makes Progress

ONE of the important developments in employment conditions of the past year has been the trend toward the five-day week. The number of industrial workers in the United States now on this time as a definite schedule, and not as a temporary expedient, is much larger than generally believed. Two surveys recently undertaken indicate the number is not far from three-quarters of a million.

The National Industrial Conference board learned recently that 270 manufacturing establishments employing in the aggregate 218,000 persons are operating on a regular five-day schedule. This number includes the Ford plants, but not workers in the building trades. It estimates a total number of 400,000 persons at the beginning of 1929. In another survey, the bureau of labor statistics discovered that approximately 226,800 industrial workers went on a five-day week between June 1 and Oct. 6, 1929. The majority of these were in the building trades.

The conference board's investigation indicates that the five-day workers in manufacturing industries constitute only 2.6 per cent of the industrial workers of the country, and 80 per cent of those are employed in Ford plants. Furthermore, the five-day week does not always mean a 40-hour week, but that hours are lengthened to make up for the decrease in the number of days.

While it has passed the experimental stage in some industries, it has not proved its effectiveness in continuous-process industries, such as iron and steel. Weekly earnings in many instances have been maintained on a 6-day basis, while the employes have been working only five.

Will Autos Hold Steel Use Lead?

BY AN exceedingly narrow margin—0.74 per cent, to be exact—the automotive industry in 1928 nosed out the railroads as the premier consumer of finished steel. In view of the noteworthy expansion in buying of both of these major outlets for steel in 1929, the annual analysis, which is now in process, assumes unusual importance.

In 1928 the automotive industry accounted for 5,640,509 tons of finished steel, or 17.76 per cent of the total. The railroads, with 5,404,101 tons, were a close second at 17.02 per cent. A fractional increase in freight car and locomotive buying and an insignificant decrease in automobile production would have tipped the scales.

In 1929 it is estimated 5,400,000 cars and trucks, or approximately 1,000,000 more than a year ago, have been produced. This is an increase of 18.5 per cent. Meanwhile, the railroads have forged ahead; it is estimated that freight car purchases for the year will approximate 106,000, compared with 44,763 last year, while locomotive purchases have expanded from 600 to 900. Railroad track material orders vary little, but bridge construction has gained.

The additional million cars and trucks would seem to retain the lead for the automotive industry, despite the 140 per cent increase in freight car and 50 per cent gain in locomotive buying. It is definite that the entire expansion in the automotive industry accrues to 1929, but at least a fair proportion of 1929 railroad equipment orders will carry over into 1930. And the carryover into 1930 will be greater than the carryover into 1929. At best it will be a close heat between these leading steel consumers.

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E. L. SHANER, Editor. — *J. D. PEASE, Advertising Director.* — *F. F. LIGHT, Circulation Manager.*

Making 250,000 Universal Joints a Month. Page 1555.

Bearings Absorb Large Steel Tonnage

OUT of sight, out of mind" is a proverb which does not appeal to manufacturers of ball bearings, or of roller bearings, either, for that matter. Bearings are used in many ways, in many thousands of mechanisms, but they are nearly always out of sight, and therefore generally out of the public's mind. A leading manufacturer of ball bearings recently had occasion to make a survey to estimate the amount of steel used in this type of bearings in the United States, and was surprised to find it approximately 100,000 tons annually. Messenger call boxes are more conspicuous than ball bearings, but they only take 7 tons of steel a year. Large Uses of Steel in Small Ways, page 1566, discloses interesting information on ball bearings.

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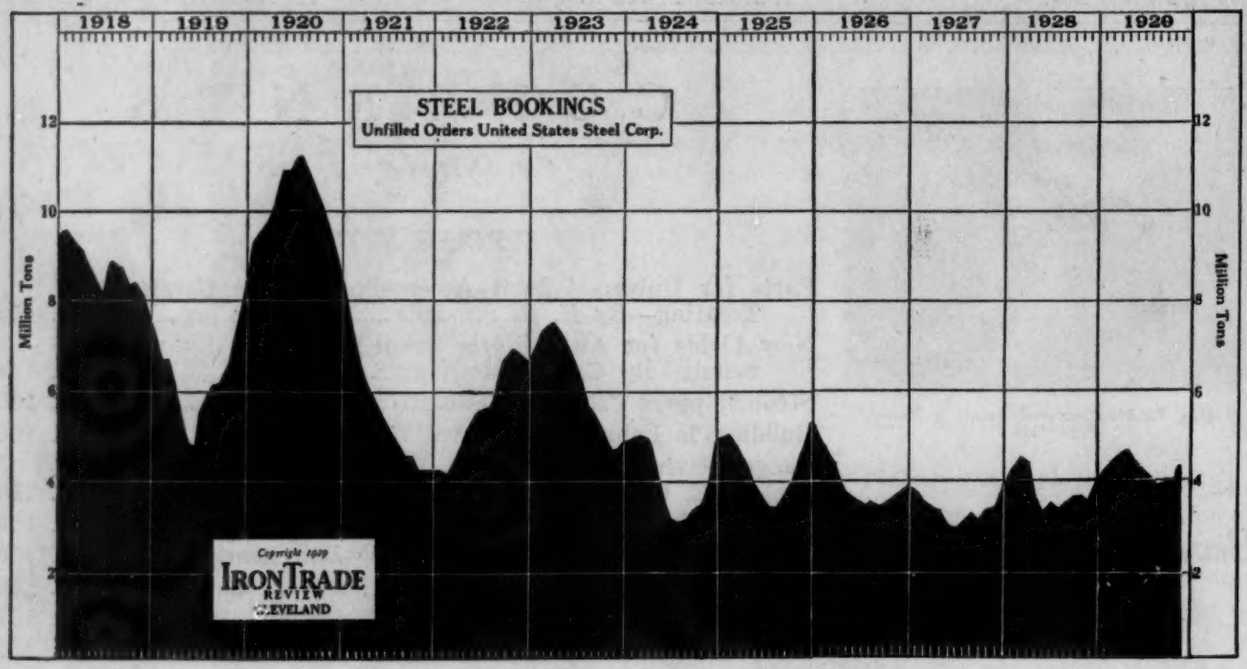
The Business Trend



Indications Point to Recovery in 1930

By JOHN W. HILL, Financial Editor

UNFILLED orders of the United States Steel Corp. have been increasing steadily since September and this tendency was not interrupted in November. However, the advance reflected diminished buying activity and it was only a fraction of the increases of the two preceding months. During November unfilled orders gained 38,783 tons, against an increase of 183,981 tons in October and one of 244,370 tons in September.

THE bookings do not give an adequate picture of the actual slackening which has taken place in the steel trade in the past month. In fact, the record of unfilled orders is no longer regarded as the same infallible barometer of business that it once was.

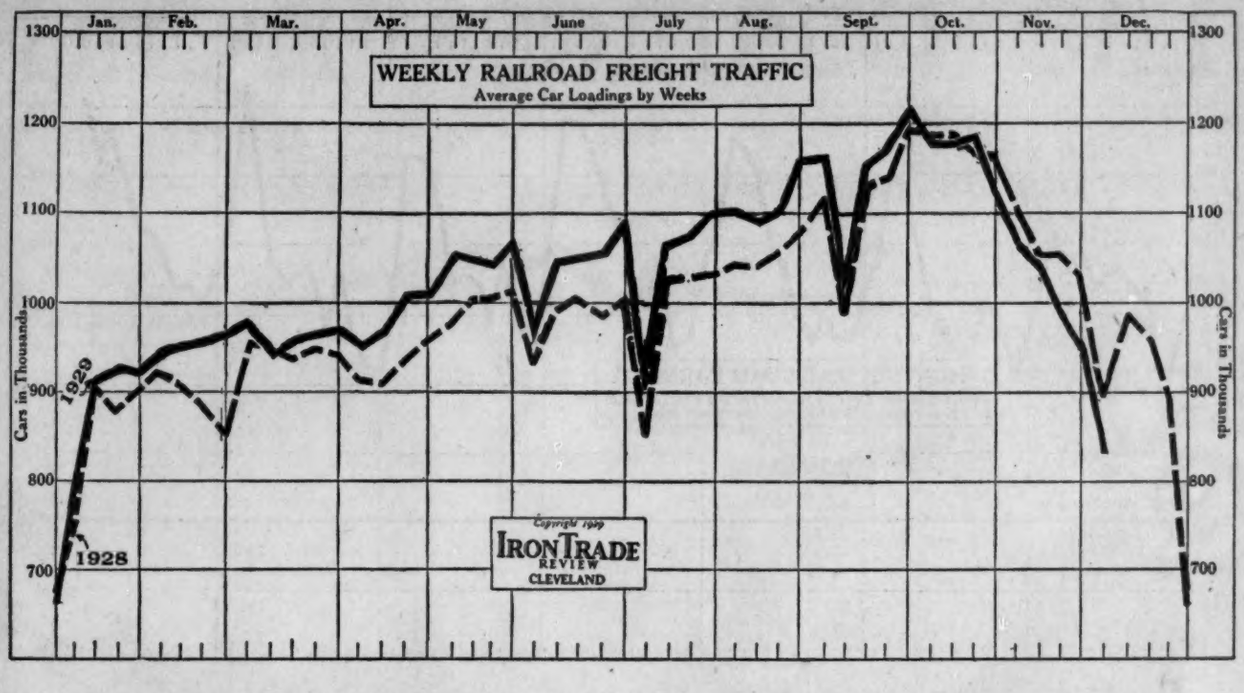
THE significance of the change in the meaning of the old time barometer is that hand-to-mouth buying apparently has come to stay. At any rate, it will remain while prices continue as stable as they have with all inflationary tendencies absent, and while ample railroad service banishes fears of car shortages. Meanwhile, the lack of overbuying in good times eliminates, in large measure, the danger of wholesale concellations.

MOST of the increase in steel orders reported by the Steel corporation in recent months is attributed to the placing of railroad orders. The steel industry's other most important customer, the automobile trade, is taking little steel. However, there are signs that some degree of improvement is near at hand in that industry. Reports from Detroit indicate that more steel is moving into automotive plants.

PROBABLY a good part of the current quickening of motor car production is to provide dealers with new models in anticipation of the January shows. It is not likely that many of the companies will push outputs to large volumes. In fact, the policy may be to await developments in demand early next year. Nevertheless, the most severe part of the letdown apparently is passing and January promises to bring a gradual improvement.

BUILDING construction has not yet felt the stimulus of the Hoover conferences, according to the indications of the November record of awards. F. W. Dodge Corp. reports that during the month total new contracts declined 30 per cent from November, 1928.

The Business Trend

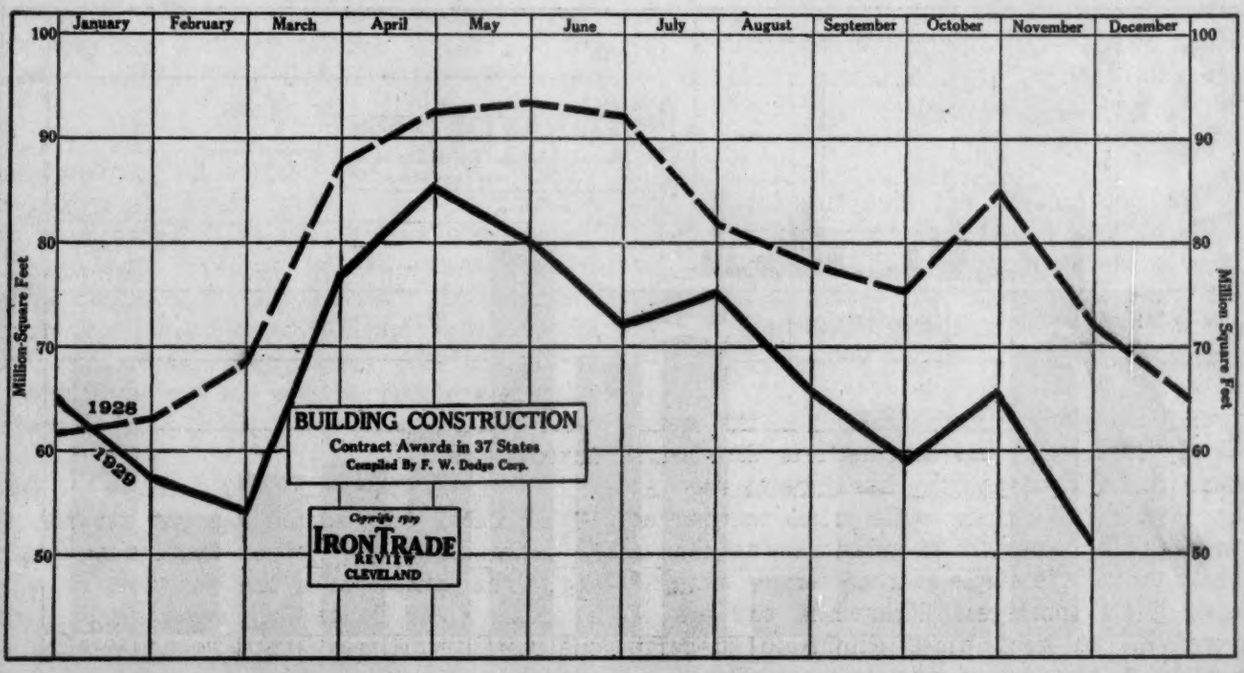


Weekly Freight Traffic

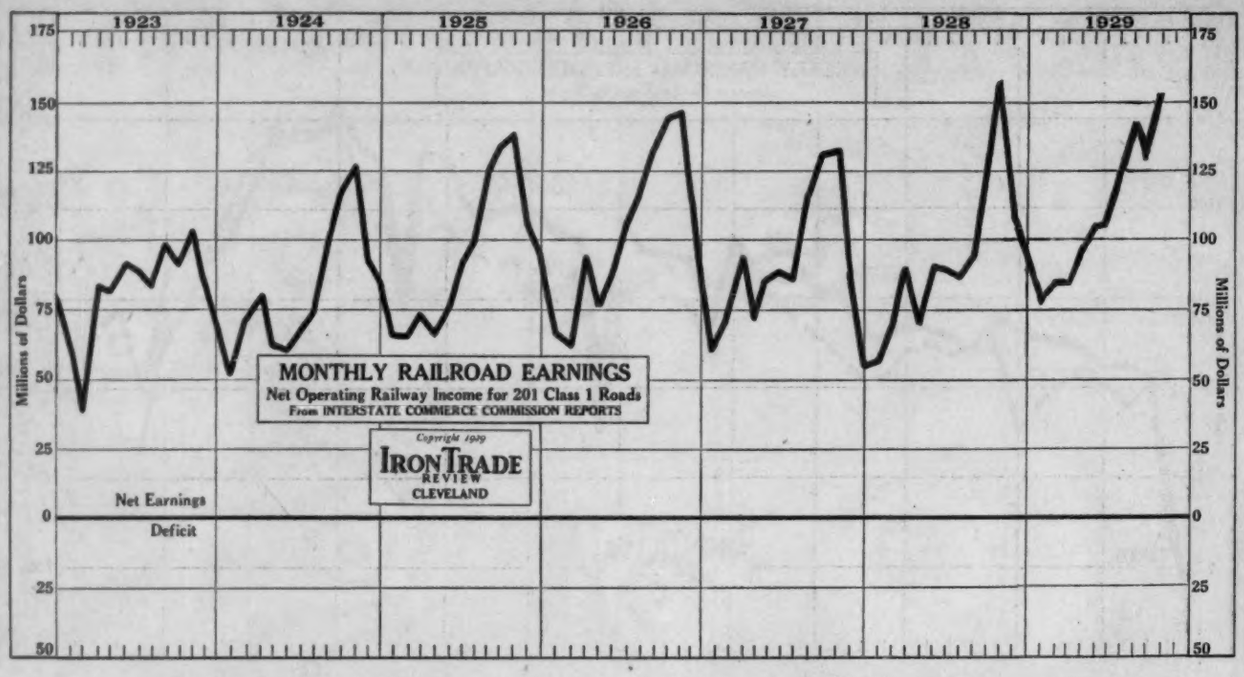
LOADINGS of revenue freight for the week ended Nov. 30 totaled 837,107 cars. A decline of 113,173 cars below the preceding week was due to the observance of Thanksgiving day. However, the total for the week was 63,449 cars below that of the corresponding week in 1928. It was also 81,000 cars below the like week of 1927. Except the loadings of coal, movement of practically all other important classifications of freight showed a decline compared with one year previously. The year's total figure exceeds that of 1928.

Building Construction

BUILDING construction awards declined sharply during November. Total reported by the F. W. Dodge Corp. for 37 states was 51,032,400 square feet. This compared with 65,609,200 square feet in October and 73,756,400 square feet in November, 1928. The decline from one year ago was 30 per cent. Residential building dropped 50 per cent from the same month one year ago, while industrial building gained 4 per cent, totaling 7,159,000 square feet for the month. It was below the month of October, however.



The Business Trend

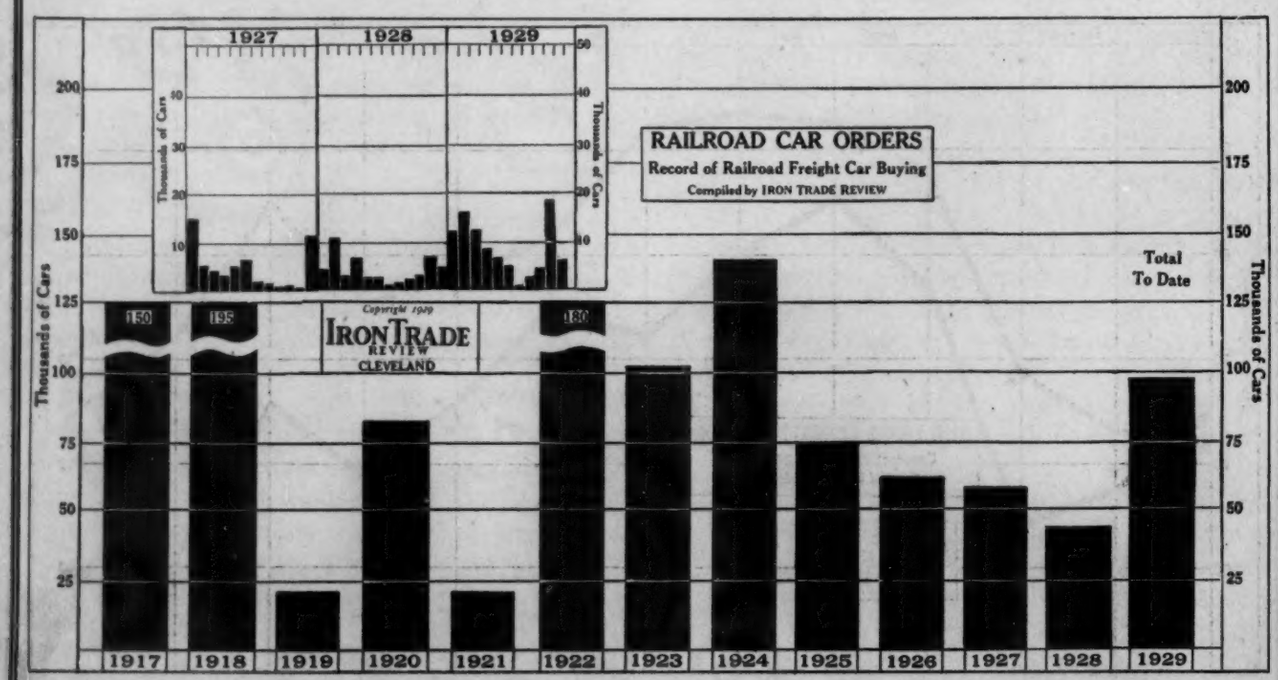


Railroad Earnings

DURING the first ten months of 1929 Class I railroads had a net operating income of $1,113,439,327. This was at the annual rate of 5.19 per cent on their property investment. It compared with net income in the corresponding ten months of 1928 of $986,170,768 or 4.66 per cent on property investment. During October Class I roads had a net operating income of $152-987,000, compared with $133,000,000 in September and $165,623,000 in October, 1929. A new high annual record is indicated.

Railroad Car Orders

FREIGHT car purchases in November were lower than in the preceding month but higher than corresponding months in preceding years. Total awards for new freight cars placed on the roads during the month were 6361 compared with 19,506 in October and 6140 in November, 1928. In 1927 and 1926, November awards were 1189 and 3925 cars, respectively. Total awards for 11 months amounted to 96,395, compared with 44,763 for all of 1928, and 63,000 for all 1927. A new record since 1924 is indicated.



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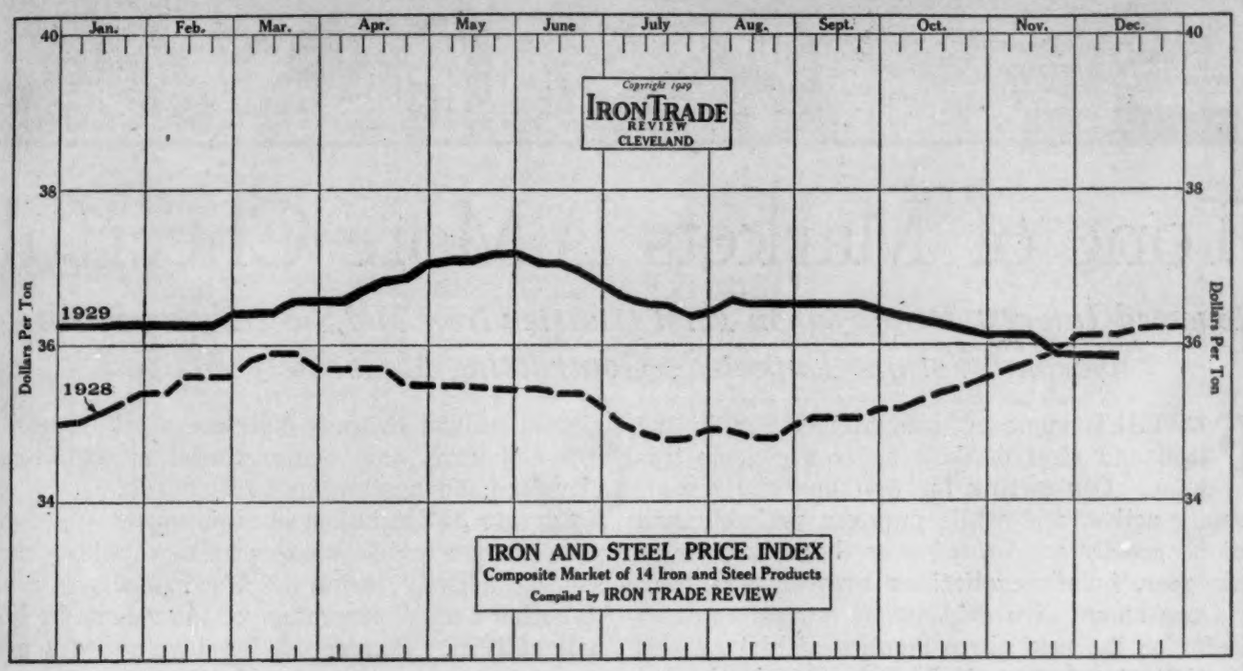
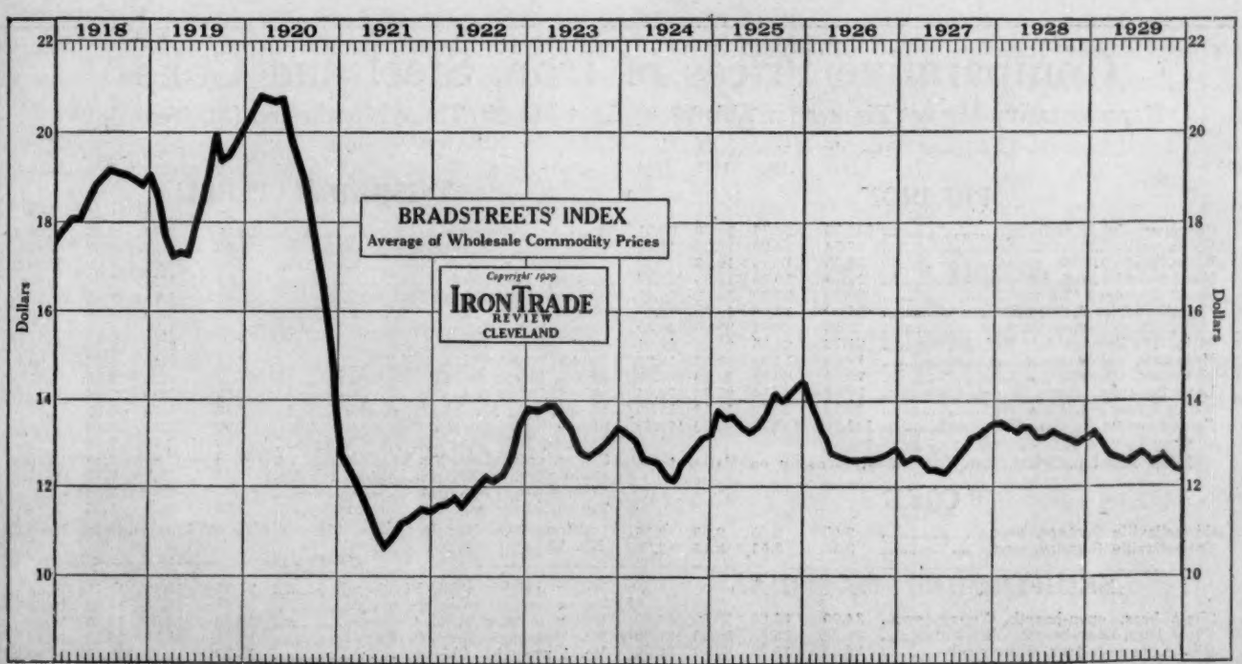


Steel Price Index

IRON and steel prices continue to hold fairly steady despite the slackness of demand. IRON TRADE REVIEW composite market average for the week ended Dec. 11 was $35.95. This compared with $35.97 the preceding week. The recession was due to a decline in the eastern Pennsylvania foundry iron prices. At the current level the composite demand is the low point of the year and is 25 cents below the level for December, 1928. Lack of inflation in iron and steel prices is indicated by the small recent decline.

Bradstreet's Index

NOVEMBER brought a downward movement in wholesale commodity prices as measured by Bradstreet's index. The recession, however, was not precipitate. At the beginning of December Bradstreet's index number stood at $12.23. This was a decrease of 1.3 per cent from the preceding month and of 5.9 per cent from the preceding month and in March. Compared with one year ago, the index is 7 per cent lower. Failure of prices to move down violently in step with the stock market reveals a lack of inflation.



Tone of Markets Is More Cheerful

Renewed Interest Displayed in First Quarter Iron and Steel Requirements—Normal Volume Expected—Contracting Moderately Active

FURTHER signs of gradual recovery in the iron and steel markets are conspicuous this week. Contracting for first quarter is moderately active, and while progress probably will not be greatly accelerated over the remainder of this year, quiet negotiations between producers and consumers give evidence of normal contract needs for the next three months. This pertains especially to structural shape buyers, implement makers, railroads and general manufacturers. In many other directions the markets reflect expanding needs, and the outlook is distinctly brighter than two weeks ago.

Alabama Iron Up; Semifinished Lower

No pronounced trend is observable in prices of pig iron or finished steel, though admittedly the volume of demand has not reached proportions for a real test. Southern pig iron producers have so far liquidated their stocks and taken on additional obligations for first quarter that they have advanced prices 50 cents, to $14.50 to $15, base, Birmingham. Semifinished steel prices have yielded ground in some districts, sheet bars, billets and slabs now being offered at $34, base, Cleveland, Youngstown and Pittsburgh.

Surveys of finished steel requirements for next year by some middle western makers indicate thus far that activity during the first half should come to within a small percentage of the volume in first half of 1929. They report low inventories a pronounced feature, with specifications averaging a fairly uniform level for the past five weeks.

Individual orders are decidedly numerous, although tonnages in most instances are growing smaller. The tonnage specified apparently is going into consumption as little forward contracting has been done in any of the finished lines except railroad material. Farm implement makers are remarkably busy, although they are holding back a little tonnage for shipment until next month.

More Interest in Automotive Sheets

Renewed interest in the sheet market is displayed by some of the leading automotive manu-

Comparative Prices of Iron, Steel and Coke

Representative Market Figures for This Week, Last Month, Three Months and One Year Ago

	Dec. 18, 1929	Nov. 1929	Sept. 1929	Dec. 1928
PIG IRON				
Bessemer, del. Pittsburgh	$20.76	20.76	20.76	20.01
Basic, valley	18.50	18.50	18.50	17.50
Basic, eastern, del. eastern Pa.	19.75	19.75	19.85	19.75
No. 2 foundry, del. Pittsburgh	19.76	19.76	19.76	19.76
No. 2 foundry, Chicago	20.00	20.00	20.00	20.00
*Southern No. 2, Birmingham	14.50	14.00	14.00	16.50
**No. 2X, Virginia furnace	18.25	18.25	20.00	20.50
**No. 2X, Eastern del. Philadelphia	21.76	22.26	22.26	22.01
Malleable, valley	19.00	19.00	19.00	18.00
Malleable, Chicago	20.00	20.00	20.00	20.00
Lake Superior, charcoal, del. Chicago	27.04	27.04	27.04	27.04
†Gray forge, del. Pittsburgh	19.13	19.13	19.13	18.76
Ferromanganese, del. Pittsburgh	104.79	109.79	109.79	109.79

*1.75 to 2.25 silicon. **2.25 to 2.75 silicon.
†Now based on Pitts. dist. fur. price; formerly on Valley base.

COKE				
Connellsville furnace, ovens	2.65	2.65	2.65	2.75
Connellsville foundry, ovens	3.50	3.55	3.75	3.75
SEMIFINISHED MATERIAL				
Sheet bars, open-hearth, Youngstown	34.00	35.00	35.00	34.00
Sheet bars, open-hearth, Pittsburgh	35.00	35.00	35.00	34.00
Billets, open-hearth, Pittsburgh	35.00	35.00	35.00	33.00
Wire rods, Pittsburgh	40.00	40.00	42.00	42.00

	Dec. 18, 1929	Nov. 1929	Sept. 1929	Dec. 1928
FINISHED MATERIAL				
Steel bars, Pittsburgh	1.90	1.90	1.95	1.90
Steel bars, Chicago	2.00	2.00	2.05	2.00
Steel bars, Philadelphia	2.22	2.22	2.27	2.27
Iron bars, Chicago	2.00	2.00	2.05	2.00
Shapes, Pittsburgh	1.90	1.90	1.95	1.90
Shapes, Philadelphia	1.91	1.96	2.06	2.06
Shapes, Chicago	2.00	2.00	2.05	2.00
Tank plates, Pittsburgh	1.90	1.90	1.95	1.90
Tank plates, Philadelphia	2.10	2.10	2.15	2.10
Tank plates, Chicago	2.00	2.00	2.05	2.00
Sheets, black, No. 24, Pittsburgh	2.75	2.75	2.85	2.85
*Sheets, blue anl., No. 18, Pittsburgh	2.35	2.35	2.35	2.10
Sheets, gal., No. 24, Pittsburgh	3.40	3.45	3.50	3.60
Sheets, black, No. 24, Chicago	2.90	2.95	3.10	3.00
*Sheets, blue anl., No. 18, Chicago	2.50	2.50	2.50	2.25
Sheets, galvanized, No. 24, Chicago	3.55	3.65	3.75	3.75
Plain wire, Pittsburgh	2.40	2.40	2.45	2.45
Wire nails, Pittsburgh	2.40	2.40	2.50	2.60
Tin plate, per base box, Pittsburgh	5.35	5.35	5.35	5.35

*Comparison for December, 1928, is with old blue annealed base, No. 10.

SCRAP				
Heavy melting steel, Pittsburgh	15.25	16.30	18.45	17.60
Heavy melting steel, eastern Pa.	14.50	15.13	16.38	15.35
Heavy melting steel, Chicago	12.50	13.05	15.05	14.50
No. 1 wrought, eastern Pa.	15.25	16.25	16.13	15.50
No. 1 wrought, Chicago	13.20	13.85	15.70	14.50
Rails for rolling, Chicago	14.50	15.30	17.60	16.50

Current Prices for Rolled Steel Products

STEEL PLATES

Pittsburgh, base	1.90c
Philadelphia, del	2.10c to 2.15c
New York, del.	2.175c to 2.225c
Boston, del.	2.265c to 2.415c
Chicago, base	2.00c
Cleveland, delivered	2.09c
Lackawanna, N. Y., base	2.05c to 2.15c
Birmingham, base	2.05c
Coatesville, Pa., base	2.00c to 2.05c
Pacific Coast, c.i.f.	2.35c
St. Louis, del.	2.22c
Detroit, del.	2.19c

STRUCTURAL SHAPES

Pittsburgh, base	1.90c
Philadelphia, del.	1.91c to 2.01c
New York, del.	2.145c to 2.195c
Boston, del.	2.265c
Chicago, base	2.00c
Cleveland, delivered	2.09c
Lackawanna, N. Y.	2.05c to 2.15c
Birmingham, base	2.05c
Bethlehem, Pa., base	2.00c to 2.10c
Pacific Coast, c.i.f.	2.35c
Detroit, del.	2.19c

BARS

SOFT STEEL

Pittsburgh, base	1.90c
Chicago, base	2.00c
Birmingham, base	2.05c
Lackawanna, N. Y., base	2.00c to 2.05c
Pacific Coast, c.i.f.	2.35c
Cleveland, base, local mills	1.85c to 1.90c
Cleveland, del., outside mills	1.90c
Philadelphia, del.	2.22c
New York, delivered	2.24c to 2.29c
Boston, delivered	2.265c
Detroit, del.	2.07c to 2.19c
Pittsburgh, cold finishing	2.00c
Pittsburgh, forging quality	2.15c

RAIL STEEL

Chicago Heights	1.90c to 1.95c
Eastern mills	1.85c to 1.95c

IRON

Chicago, base	2.00c to 2.10c
New York, delivered	2.19c to 2.24c
Philadelphia, delivered	2.17c to 2.22c
Pittsburgh, refined	2.75c to 4.25c

REINFORCING

Pittsburgh, billet, cut lengths	2.20c
Stock lengths from mill	1.95c
Chicago, billet	2.00c to 2.10c
Chicago, rail steel	1.85c to 2.00c
Chicago, rail steel, road and bridge work	1.95c to 2.05c
Philadelphia, cut lengths	2.32c to 2.42c

CORROSION, HEAT RESISTANT ALLOYS
Base, Pittsburgh

18 per cent chrome, 8 per cent nickel

Sheets....35.00c; plates....31.00c; bars....28.00c

Chr. over 16% to 23%; C. 0.12% and under

Sheets....32.00c; plates....28.00c; bars....25.00c

Chr. 16% and under; C. 0.12% and under

Sheets....27.00c; plates....23.00c; bars....20.00c

Chr. 16% and under; C. over 0.12%

Bars 37.00c

Chr. over 16%; C. over 0.12%

Bars 35.00c

SHEETS

SHEET MILL BLACK, No. 24

Pittsburgh, base	2.75c
Philadelphia, delivered	2.97c to 3.07c
Gary, Indiana Harbor	2.85c
Chicago, delivered	2.90c
Birmingham base	3.00c
St. Louis, del.	3.07c

TIN MILL BLACK, No. 28

Pittsburgh, base	2.90c to 3.00c
Gary, base	3.00c to 3.10c

GALVANIZED, NO. 24

Pittsburgh, base	3.40c to 3.50c
Philadelphia, delivered	3.67c to 3.72c
Gary, Indiana Harbor	3.50c to 3.60c
Chicago delivered	3.55c to 3.65c
Birmingham, base	3.65c
St. Louis, del.	3.82c

BLUE ANNEALED
Sheets, No. 13

Pittsburgh, base	2.35c
Chicago, district mills	2.45c
Chicago, delivered	2.50c
St. Louis, delivered	2.67c
Philadelphia, delivered	2.67c
Birmingham	2.50c

Plates, No. 9 and 10

Pittsburgh, base	2.20c
Chicago district mills	2.30c
Chicago, delivered	2.35c
Philadelphia, delivered	2.52c
St. Louis, delivered	2.52c
Birmingham	2.35c

AUTOMOBILE, NO. 20

Pittsburgh, base	4.00c
Detroit, delivered	4.29c

FURNITURE

Pittsburgh	4.00c to 4.10c

(Turn to the following page)

facturers. Fair size orders have been placed for early shipment by several companies in the Detroit district, and by an automobile bodybuilder. Large first-quarter commitments are withheld, and considerable pressure is being brought to bear against prices.

Production of strip steel has been speeded up this week, in anticipation of a complete shutdown of strip mills next week. A leading producer in the Middle West is basing its general plans for cold strip production on the theory that automobile output over the next five or six years will average about 5,000,000 cars a year.

Structural Shape Awards Show Increase

Structural shape awards for the week are the heaviest of any week in the past five years. An award of 55,000 tons for the Empire State building, New York, was made this week to the American Bridge Co. December awards in the metropolitan New York district are ahead of those of the comparable period in 1928, and tonnages for buildings are expected to top 1928 by more than 150,000 tons.

New orders for rails and cars for the moment tend to subside, though promising a heavy volume of business for first quarter. Canadian National has placed an order for 120,000 tons of rails with two Canadian mills. Central of New Jersey purchased 12,000 tons. Canadian National distributed an additional 2400 cars, while Missouri Pacific awarded 1282. Illinois Central is expected to place 5000 to 6000 cars in a few days. Louisville & Nashville is in the market for 1800. Reading placed 2000 steel box cars.

Substantial improvement is noted in demand for steel bars, requirements from agricultural implement manufacturers and makers of road-building equipment making up to some extent for lack of automotive orders.

Pipe and Wire Demands More Active

Public utilities are inquiring for cast iron pipe, Milwaukee waterworks being in the market for 8000 tons, and various eastern consumers taking prices on a total of 6000 tons. Awards include 3000 tons for eastern properties of United Gas Improvement Co., Philadelphia.

Wire manufacturers are much encouraged over the change in their market; a good tonnage has been closed for the first quarter.

Scrap prices have practically ceased their downward trend, and a few advances are noted.

Steel ingot production in the Pittsburgh district is off slightly to an average of 60 to 65 per cent, while a slight improvement is noted in the valley, were independents are operating at an average of 50 per cent and Steel corporation units at 60 per cent. Production in the Chicago district is unchanged at an average of 65 per cent, compared with 80 per cent a year ago. An advance in Alabama pig iron has raised IRON TRADE REVIEW's composite of 14 leading iron and steel products 2 cents to $35.97.

Composite Market Average

Based on Pig Iron, Billets, Slabs, Sheet Bars, Wire Rods, Steel Bars, Plates, Structural Shapes, Black, Galvanized and Blue Annealed Sheets, Tin Plate, Wire Nails and Black Pipe

This week (December 18, 1929)	$35.97
Last week (December 11, 1929)	35.95
One month ago (November, 1929)	36.03
Three months ago (September, 1929)	36.50
One year ago (December, 1928)	36.22
Ten years ago (December, 1919)	54.88
Fifteen years ago December, 1914)	21.58

Current Rolled Steel Prices

PRICES IN CENTS PER POUND UNLESS OTHERWISE INDICATED

Tubular Products Quoted On Last Editorial Page—See Preceding Page For Other Products

HOOPS, BANDS, STRIPS

Hot strip, to 6-in., Pitts	2.00c
Hot strip 6 1/4 to 24-in., Pitts	1.90c
Hot strip, bands 6 in. and under, Chicago	2.10c
Do, 6 1/4 to 23 3/4	2.00c
Cooperage stock, Pittsburgh	2.20c
Do, Chicago	2.30c
Cold rolled strip, hard coils, 16 inches and under by 0.100-inch and heavier, base Pitts., Cleve, (3 ton and over)	2.75c
Worcester, Mass. (3 tons and over)	2.90c to 3.00c

ALLOY STEEL

Hot Rolled
F.o.b. Mills
Alloy Quality Bar Base is 2.65c

S.A.E. Series Number	Alloy differential	Net 100 lb.bars
2000	0.25	$2.90
2100	0.55	3.20
2300	1.50	4.15
2500	2.25	4.90
3100	0.55	3.20
3200	1.35	4.00
3300	3.80	6.45
3400	3.20	5.85
4100 0.15-0.25 Mo.	0.50	3.15
4100 0.25-0.40 Mo.	0.70	3.35
4600 0.20-0.30 Mo. 1.25-1.75 Ni.	1.05	3.70
5100 0.60-0.90 Cr.	0.35	3.00
5100 0.80-1.10 Cr.	0.45	3.10
5100 Chrome Spring	0.20	2.85
6100 Bars	1.20	3.85
6100 Spring Steel	0.95	3.60
Chrome Nickel Vanadium	1.50	4.15
Carbon Vanadium	0.95	3.60
9250 (flats)	0.25	2.90
9250 (rounds, squares)	0.50	3.15

Hot rolled alloy billets 4 x 4-inch and over take same price per gross ton as same specification alloys bars per net ton. Sizes under 4 x 4 to 2½ in. x 2½ in. inclusive sold on bar basis plus steel bar card extras for size. Sizes under 2½ in. x 2½ in. take bar price on net ton basis.

COLD FINISHED STEEL

Bars, drawn or rolled, Pitts., Chi., Buffalo, and Cleve. c.l.	2.20c
Do, delivered, Detroit	2.435c
Shafting (turned, polished) Pittsburgh, Buffalo	2.20c
Shafting (turned, ground) mill (Depending on size, 1 3/16 to 7-inch)	2.55c to 3.00c

WIRE PRODUCTS

F.o.b. Pittsburgh, Cleveland, Ironton base
(Per 100 pound keg)

	Trade	Jobbers
Standard wire nails	$2.50	$2.40
Cement coated nails	2.50	2.40
Galvanized nails	4.50	4.40
(Per pound)		
Polished staples	2.95c	2.85c
Galvanized staples	3.20c	3.10c
Barbed wire, galvanized	3.15c	3.05c
Annealed fence wire	2.65c	2.55c
Galvanized wire	3.10c	3.00c

Woven wire fencing, retailers, Pittsburgh-Cleveland, net ton $65.

Anderson, Ind., $1 higher. Chicago $2 higher, Duluth, Birmingham $3 higher.

Bright plain wire, 6 to 9 gage	2.40c
Wire, delivered Detroit	2.57c
Nails, delivered Detroit	$2.58 to 2.72

Joliet, DeKalb and Waukegan, Ill., Anderson, Ind., and Chicago prices $1 per ton over Pittsburgh-Cleveland-Ironton base on products made there; Duluth $2 higher; Worcester, Mass., Fairfield, Ala., $3 higher.

CUT NAILS, CHAIN, PILING

Cut nails, c.l., f.o.b. mills	2.70c
Cut nails, l.c.l. f.o.b. mills	2.80c
Sheet piling, base, Pittsburgh	2.20c
Chain proof BB and BBB, Pitts.	
3/16-in. to ½-in.	33 1/3 and 5 off
9/16-in. to 1½-in.	33 1/3 off

CAST IRON WATER PIPE

Class B Pipe—Per Net Ton

Six-inch and over, Birming'm	$37.00 to 38.00
Four-inch, Birmingham	41.00 to 42.00
Four-inch, Chicago	48.20 to 49.20
Six-inch to 24-inch, Chicago	44.20 to 45.20
Six-inch and over, New York	36.50 to 38.50
Four-inch, New York	40.00 to 41.00
Standard fittings, Bir. base	$100.00

Six to 24-inch, base; over 24-inch, plus $20; 4-inch, plus $10; 3-inch, plus $20; gas pipe fittings, $5 higher.

Class A pipe is $4 higher than Class B.

TIN PLATE; TERNE PLATE

Prices per 100-pound box Pittsburgh

*Tin plate, coke base	$5.35

Gary, Ind., base 10 cents higher.

Long ternes, primes, No. 24— 4.00c to 4.10c

*Price subject to quantity differentials.

WASHERS

Wrought, c.l., Pitts. dist.	$6.50 to 6.75 off
Wrought, c.l., Chicago dist.	$6.70 2 to 26.90 off
Lock: to dealers	85-5 off
Lock: to consumers	85 off

RAILS, TRACK MATERIAL

Standard bessemer rails, mill	$43.00
Standard open-h'th rails, mill	$43.00
Relay rails, Pitts., 60 to 90 lb.	$24.00 to 29.00
Light rails, 25 to 45, mills	$36.00
Angle bars, Chicago base	2.75c
Spikes, railroad, Pittsburgh	2.80c
Spikes, small railroad, 7/16-inch and smaller, Pitts.	2.80c
Spikes, boat and barge, Pitts.	3.00c
Spikes, railroad, Chicago	2.80c
Track bolts, Pitts., steam roads	3.80c
Track bolts, Pitts., stand. jobbers	70 off list
Track bolts, Chicago	3.80c
Tie plates, Chicago, Pitts.	$43.00

BOLTS AND NUTS

Pittsburgh, Cleveland, Birmingham and Chicago

Discounts are for legitimate jobbing or large consuming trade purchasing in full-case lots, apply to lists of April 1, 1927. Small lots are 55 to 60 per cent off.

CARRIAGE BOLTS

All sizes, cut thread	60 to 70 off

Rolled thread ⅝ x 6 and smaller take 10 per cent lower list.

Eagle list	60 to 70 off

MACHINE BOLTS

All sizes, cut thread	60 to 70 off

Rolled thread ⅝ x 6 and smaller take 10 per cent lower list.

Lag screws	60 to 70 off
Plow bolts, Nos. 1-2-3-7 heads	60 to 70 off
Tap bolts	60 to 70 off
Blank bolts	60 to 70 off
Stud bolts without nuts	60 to 70 off

Stove bolts, 75, 20 10 and 5 off in pkgs., 75, 10, 10 and 5 with 2½ off in bulk.

Tire bolts	60-5 off

Nuts

Semifinished	60 to 70 off

HEXAGON CAP SCREWS

Milled	80-10-5 off
Upset 1 in. diam. and smaller	5 off

SQUARE HEAD SET SCREWS

Milled	80-5 off
Upset 1 in. diam. and smaller	80-10-5 off

RIVETS

Struc., c.l., Pitts.-Cleve.	3.10c
Structural, c.l. Chicago	3.20c
**7/16-inch and smaller, Pitts.	70 and 10 off
Chi., Cleve.	70 to 70 and 10 off

**Some makers quoting 70 off with freight allowed on 300 pounds or more.

Raw Materials and Semifinished Products

SEMIFINISHED STEEL

Prices Per Gross Ton

BILLETS AND BLOOMS
4 x 4-inch base

Pittsburgh, open-hearth	$34.00 to 35.00
Pittsburgh, bessemer	34.00 to 35.00
Youngstown	34.00
Cleveland	34.00
Philadelphia	40.30
Chicago	36.00
Forging, Chicago	41.00
Forging, Pittsburgh	40.00
Forging, Philadelphia	45.30

SHEET BARS

Pittsburgh	$34.00 to 35.00
Youngstown	34.00
Cleveland	34.00
Chicago	36.00

SLABS

Pitts., Young.	$34.00 to 35.00
Cleveland	34.00

WIRE RODS

Pittsburgh, Cleveland	$40.00
Chicago	41.00
Youngstown	40.00 to 42.00

SKELP

All grades, Pittsburgh	1.85c to 1.90c

IRON ORE

LAKE SUPERIOR ORE
Per Gross Ton, Lower Lake Ports

Old range bessemer, 51½%	$4.80
Mesabi bessemer, 51½%	4.65
Old range nonbessemer, 51½%	4.65
Mesabi nonbessemer, 51½%	4.50
High phosphorus, 51½%	4.40

EASTERN LOCAL ORES
Cents per unit delivered at Eastern Pennsylvania and New Jersey furnaces

Foundry and basic, 56-63%	9.00 to 10.00
Copper-free low phos. 58-65%	nominal

FOREIGN ORE
Cents per units, alongside docks
Atlantic ports

Foreign manganiferous ore, 45-55% iron, 10-12% manganese	12.00 to 12.50
North African low phosphorus	12.50
Swedish basic, 65%	10.50
Swedish low phosphorus	12.00
Spanish and North African basic, 50 to 6% (nominal)	11.50 to 12.00
Newfoundland foundry, 55%	nominal
Tungsten future, short ton unit, duty paid	15.25 to 15.50
Chrome ore, 48-50%, long ton c.i.f.	$22.00 to 24.00

MANGANESE ORE

Prices, not including duty, are cents per unit; cargo lots.

Caucasian (52-55 per cent)	30 to 32 cents
Indian (48-50 per cent)	30 to 32 cents
Brazilian (46-48 per cent)	29 to 31 cents

FLUORSPAR

85 and 5 per cent grade

Washed gravel, Kentucky and Illinois mines, per net ton	$18.00
Washed gravel, import duty paid east, tide., gross ton	$21.00

REFRACTORIES

FIRE CLAY BRICK
Per 1000 f.o.b. works
First Quality

Pennsylvania	$43.00 to 46.00
Ohio	43.00 to 46.00
Illinois	43.00 to 46.00
Kentucky	43.00 to 46.00
Missouri	43.00 to 46.00
Maryland	43.00 to 46.00
Georgia and Alabama	40.00 to 45.00

Second Quality

Pennsylvania	35.00 to 38.00
Ohio	35.00 to 38.00
Illinois	35.00 to 38.00
Kentucky	35.00 to 38.00
Missouri	35.00 to 38.00
Maryland	35.00 to 38.00
Georgia and Alabama	30.00 to 35.00

SILICA BRICK

Pennsylvania	43.00
Joliet, Ill., East Chicago, Ind.	52.00
Birmingham	50.00 to 51.00

MAGNESITE BRICK
Per Net Ton

9 x 4½ x 2½	65.00

MAGNESITE
Net Ton Chester, Pa., and Baltimore base

Dead-burned grain magnesite	40.00
Domes., Chewelah, Wash., base	$22.00

CHROME BRICK
Net Ton Chester, Pa., and Baltimore base

9 x 4½ x 2½	45.00

Pig Iron

Production Further Reduced—Market Slow, Reflecting Year-End Influences—Alabama Pig Iron Prices Advanced

FURTHER reduction in pig iron production is noted in several districts, with the prospect of several more stacks going out of blast before the end of the year. Another Sharpsville, Pa., producer is down, leaving only two of the seven strictly merchant furnaces in the valley operating. A Buffalo unit was blown out during the week, leaving ten active in that district, the lowest number so far this year. The market generally reflects the slowing influences of the holiday season, though sales in the New York district during the week, 8000 tons, were larger than those of several weeks preceding. Consumers continue to display interest in first quarter, without contracting actively for that period. Alabama furnace interests have advanced their prices 50 cents to $14.50 to $15.

PITTSBURGH, Dec. 17.—Demand for pig iron reflects the usual slowing influences of the year-end, emphasized by the fact consumption is below normal in several lines. A number of buyers have orders due on contracts, and are not interested in additional forward purchases at this time. Others are seeking price concessions, placing tonnage only as needed. Shipments show further decrease, with plants scheduled for light operations for the remainder of the month. The United States Pipe & Foundry Co.'s plant at Scottsdale, Pa., is down, and the Columbia Steel Co.'s plant at Butler, Pa., is to be closed next week. Producers are restricting output, but year-end stocks will be slightly larger than anticipated a short time ago. Shenango Furnace Co. is to bank its second Sharpsville stack by the end of the week, leaving only seven strictly merchant valley stacks in operation. Prices are steady on current small-lot business.

New York, Dec. 17.—While still moderate, pig iron trading is the largest in several weeks. Fully 8000 tons have been closed with 5000 tons pending. Prices on Buffalo iron are unchanged at $17 to $17.50, furnace. A feature is the placing of spot tonnage. Of 2800 tons booked by one seller during the past week, fully 1000 tons was for spot shipment. Inquiries include 325 tons of foundry iron for the Holyoke, Mass., plant of the Worthington Pump & Machinery Corp. and 300 tons of iron for the New York Central. The General Electric Co. has placed 500 tons for Bayway, N. J., and 200 tons for Schenectady, N. Y., dividing this business between at least two sellers. This interest is expected in the market soon for iron for its other plants. A New England machinery builder has closed on 1000 tons of foundry with New England producers. Scattered lots of southern iron have been sold here recently at the prices ranging $19 to $19.50, New York docks.

Boston, Dec. 17.—Pig iron orders are light. Buffalo No. 2X iron is quoted $17, base, Buffalo. Mystic Iron Works and a New York furnace are meeting this. There are intimations that one melter will close for 1000 tons provided lower than $17, base, Buffalo can be done. Another melter is inquiring for 800 to 1200 tons of malleable. Reports include the sale of 2000 tons of high silicon to a Massachusetts machinery manufacturer.

Buffalo, Dec. 17.—A blast furnace at the Donner Steel Co. plant is down for repairs, reducing the number in operation in the district to ten, the smallest number of this year. The operating rate is now slightly over 50 per cent of capacity. Several small orders for iron for prompt shipment have been received from the East. Sellers claim to have obtained a $17.50 base on this business, and $19.50 on some 100-ton lots for district delivery.

Youngstown, O., Dec. 17.—Sales of pig iron are in small lots, though signs appear of more interest by melters. No. 2 foundry and basic hold at $18.50, and bessemer and malleable at $19, valley.

Cleveland, Dec. 17.—Inquiries for pig iron for first quarter are more numerous, but the individual tonnages are small or moderate in size. One merchant furnace interest received seven or eight inquiries Monday, mentioning a total of 2000 tons. Another producer has inquiries for 7000 to 8000 tons pending. Sales by Cleveland furnace interests during the past week dropped to 9300 tons from 16,000 tons in the week preceding. A large number of small orders for prompt shipments make up the total. Westinghouse Electric & Mfg. Co. is expected to take action this week on its inquiry for an unstated tonnage for Cleveland and Trafford City, Pa. Prices are unchanged.

Cincinnati, Dec. 17.—Pig iron continues quiet, although increasing interest is noted in forward requirements. Bookings during the past week were about 3000 tons, most of which was northern iron. Prices are firm. A central Ohio foundry is in the market for 1200 tons. Favorite Stove & Range Co., Piqua, O., wants 300. Reports are current that two northern stacks are to be blown out soon for repairs.

Chicago, Dec. 17.—The bulk of current pig iron orders is comprised of spot tonnage, but inquiries indicate growing interest in first quarter requirements. It is expected the carryover from fourth quarter will represent a fair volume as a number of contracts booked some weeks ago will extend into the first quarter. Several small lots of eastern boat iron have been sold from docks here at prices figuring to $19, base, but furnace interests are not meeting that quotation. A cargo of 2000 to 2500 tons

(*Concluded on Page* 1592)

Pig Iron Prices

Per Gross Ton

Bessemer, valley furnace	$19.00
Bessemer, del. Pittsburgh	20.76
Basic, valley furnace	18.50
Basic, Pitts., dist. fur.	19.00
*Basic, del., Pitts	19.63 to 20.13
Basic del., eastern Pa	19.75 to 20.25
Basic, Buffalo furnace	18.50
Malleable, valley furnace	19.00
Malleable, Pitts., dist. fur.	19.50
*Malleable, del. Pittsburgh	20.13 to 20.63
Malleable, Cleve. fur. for local del.	19.00
Malleable, Chicago furnace	20.00
Malleable, Buffalo furnace	20.00
Malleable, del. eastern Pa.	21.26 to 22.76
Malleable, Granite City fur.	20.00
No. 1 foundry, Chicago furnace	20.50
No. 1X, Eastern del., Phila.	22.26 to 22.76
No. 1X, Buffalo furnace	21.00
No. 2 foundry valley furnace	18.50
No. 2 fdy., Pitts. dist. fur.	19.00
*No. 2 foundry, del. Pittsburgh	19.63 to 20.13
No. 2 plain, Buffalo furnace	19.50
No. 2 foundry, Chicago furnace	20.00
No. 2 fdy., Cleve. fur. for local del.	19.00
No. 2 fdy., Granite City	20.00
No. 2 plain, del., Phila.	21.76
No. 2 plain, Virginia furnace	17.75
No. 2 plain, Buffalo, del. Boston	21.91 to 22.41
No. 2 plain, N. J., tidewater	21.26 to 21.76
No. 2 Alabama, Bir. base	14.50 to 15.00
No. 2 Tenn., Birmingham base	14.50 to 15.00
No. 2 Tenn., del. Cincinnati	18.19 to 18.69
No. 2 Alabama, del. Cincinnati	18.19 to 18.69
No. 2 Alabama, del., Cleveland	21.01 to 21.51
No. 2 Alabama, del. Chicago	19.51 to 20.51
No. 2 Alabama, del. St. Louis	18.92 to 19.42
No. 2 Ala., Phila., dock dely	19.75 to 20.25
No. 2 Ala., Balt., dock dely.	19.50 to 20.00
No. 2 Ala., N. Y., dock dely.	19.50 to 20.00
No. 2 Ala., Boston, dock dely.	20.71
No. 2X, east, N. J., tidewater	21.28 to 21.78
No. 2X, eastern, del. Phila.	21.76 to 22.26
No. 2X, foundry, Buffalo furnace	20.00
No. 2X, Buffalo, del. Boston	21.91 to 22.91
No. 2X, Virginia furnace	18.25
Gray forge, Pitts. dist. fur.	18.50
*Gray forge, del. Pittsburgh	19.13 to 19.63
Low phos., standard, valley	27.00
Low phos., standard, Phila.	24.76
Low phos., copper bearing fur.	23.00 to 24.00
Charcoal, Superior, del., Chicago	27.04

*Freight from Pittsburgh district furnace to points in Pittsburgh district 63.00c, 76.00c and $1.13 per ton.

CANADIAN PRICES

No. 1 foundry, del. Toronto	$23.60
No. 1 foundry, del. Montreal	25.00
No. 2 foundry, del. Toronto	23.10
No. 2 foundry, del. Montreal	24.50
Malleable, del. Toronto	23.60
Malleable, del. Montreal	25.00
Basic, del. Montreal	23.50

Silvery iron Jackson county, O., furnaces in per cents: 5—$22; 6—$23; 7—$24; 8—$25; 9—$26; 10—$28; 11—$30; 12—$32; 13—$34.

Bessemer ferrosilicon, Jackson county, O., furnaces, in per cents: 10—$30; 11—$32; 12—$34; 13—$36; 14—$38; 15—$41; 16—$43.50; 17—$46.50.

Coke

Market Is Quiet, Furnaces and Foundries Deferring Contracts—Prices Generally Unchanged

CONTINUED mild weather in most districts is adversely affecting demand for beehive and by-product heating coke, while the downward trend in pig iron production has removed blast furnaces from the market. Foundries are taking fuel sparingly. Little contracting has been done for first quarter in either furnace or foundry grades. Prices are steady.

Pittsburgh, Dec. 17.—Demand for beehive coke shows a further decline, buying of all grades being limited to only a few carloads at a time. Blast furnaces are out of the market, and spot buying is slow. The sharp decline in merchant pig iron production in the past month reduced coke shipments accordingly. Sales of foundry coke are light. Producers continue to quote $2.65 for furnace coke, but this price is not tested.

Production of coke in the Connellsville region for the week ended Dec. 7 was 42,120 tons, compared with 42,200 tons the preceding week and 60,100 tons in the same period a year ago, according to the *Connellsville Courier*.

Boston, Dec. 17.—Cold weather has resulted in heavy consumption of domestic coke. Foundry demand is unchanged. Prices remain firm.

New York, Dec. 17.—Spot demand for coke continues dull, with prices generally unchanged. Beehive foundry coke continues easy at $3.50 to $3.85, Connellsville, and beehive furnace at $2.75 to $3. By-product foundry coke is unchanged at $9 to $9.40, delivered Newark, N. J.; $11, delivered New England and $9, delivered Philadelphia.

Cincinnati, Dec. 17.—Demand for coke in this district is sluggish. Declining blast furnace operations have had no effect on prices of either foundry or domestic grades. Melters' specifications are being held to a minimum.

St. Louis, Dec. 17.—New ordering of metallurgical coke is of a routine character, and almost exclusively for prompt shipment. Average daily shipments since Dec. 1 are below those in November, but about equal to those at the corresponding period last year. Prices are unchanged.

Birmingham, Ala., Dec. 17.—Steady production and shipments are reported by independent coke producers. By-product foundry coke is unchanged at $5, base, Birmingham.

Coke Prices

Prices per Net Ton

Beehive Ovens	
Connellsville furnace	$2.65
Connellsville foundry	3.50 to 4.85
New River foundry	6.00
Wise county foundry	4.25 to 5.00
Wise county furnace	3.50 to 4.25
By-Product Foundry	
Newark, N. J., del.	$9.00 to 9.40
Chicago ovens	8.00
New England del.	11.00
St. Louis del.	9.00
Birmingham, ovens	5.00
Indianapolis del.	8.25
Ashland, Ky., ov., Connell. basis	6.50
Portsmouth, O. ov,, Connell. basis	6.50
Buffalo ovens	8.75
Detroit ovens	9.00
Philadelphia, del.	9.00

Ferroalloys

Specifications Below November Rate—Consumers Contracting

New York, Dec. 17.—Sellers of ferromanganese report a satisfactory rate of contracting at the recently announced price of $100 per gross ton, duty paid. Specifications are slightly under last month's rate. The same is true of spiegeleisen, with domestic 19 to 21 per cent, unchanged at $34 in carload lots, differentials applying to large quantities.

Special ferroalloys and tungsten ores are unchanged. Alloys are being contracted for next year but tungsten is quiet.

Pittsburgh, Dec. 17.—Fair activity is noted in booking of next year's requirements for ferromanganese although large buyers are slow to enter the market. Most of the smaller consumers have signed contracts for early months of 1930, with the $104.79 delivered, price applying. Spiegeleisen contracting is on the basis of $34 for small lots. Shipments against old orders are slow, reflecting light operations in the iron and steel industry. Prices on other ferroalloys are unchanged although there is little new business. Ferrotungsten continues $1.45.

Corporation Seeks to Buy Atlas Cement Co.

New York, Dec. 17.—The United States Steel Corp. has offered to purchase the Atlas Portland Cement Co. through an exchange of stock. It has offered 180,000 shares of common stock for the outstanding stock, assets and good will of the cement company. The Steel corporation will also assume the liabilities of the cement company. These facts were revealed in a recent letter sent by the Atlas company to its stockholders. A special meeting of stockholders has been called for Dec. 28 for formal ratification.

The Steel corporation's offer of 180,000 shares of common amounts practically to an exchange of stock on the basis of one share of steel for five shares of Atlas, it is said. The cement company has 899,211 shares of common stock outstanding upon which regular dividends of $2 a year have been paid since June, 1925.

Bolts, Nuts, Rivets

First Quarter Contracting Active at Unchanged Prices

NUT AND BOLT PRICES, PAGE 1582

Pittsburgh, Dec. 17.—First quarter contracting for bolts, nuts and rivets is fairly active, with prices steady at 60 to 70 off for bolts and nuts and 3.10c, Pittsburgh, for large rivets. Specifications against contracts reflect usual seasonal influences and are off from the November volume. Railroads are fair buyers. Operations are steady.

Cleveland, Dec. 17.—First quarter contracting has not made much progress in nuts and bolts or rivets. Carrying forward of fourth quarter quotations at unchanged levels inclines customers to procrastinate. Specifications lag, the tendency being to keep down stocks for inventory.

Chicago, Dec. 17.—Specifications for bolts, nuts and rivets are running below December, 1928, by a few points. Several encouraging market factors appear, which include low inventories and the activity of implement and tractor plants. First quarter contracting is well under way. Quotations for bolts and nuts are unchanged at 60 to 70 per cent off list.

Poland during 1928 imported 390,760 tons of iron ore and in nine months of 1929 imports totaled 530,021 tons.

Ferroalloy Prices

(In dollars, except ferrochrome)

*Ferromanganese, 78 to 82 per cent tidewater, duty paid	$100.00
*Ferromanganese, del. Pittsburgh	$104.79
Spiegeleisen, 19 to 21 per cent, domestic furnace spot†	34.00
*Ferrosilicon, 50 per cent, freight allowed, carloads	83.50
*Do., less carload	88.50
Do., 75 per cent	130.00 to 15.00
Ferrochrome, 66-70 chromium, 4-6 carbon, cts. per lb. con., del.	11.00
Do., for spot delivery	11.50
Ferrotungsten, stand., lb. cont.	1.45 to 1.50
Ferrovanadium, 30-40 per cent, per lb., contained, on analysis	3.15 to 3.65
Ferro-carbon-titanium carload producer's plant, net ton	160.00
Do., one ton to carload	170.00
Ferrophosphorus, per ton, carload 17 to 19 per cent, Rockdale Tenn., basis (18 per cent)	91.00
Ferrophosphorus, electolytic, per ton, carload, 23-25% f.o.b. Anniston, Ala. (24 per cent)	122.50

†Carloads. Differentials apply to large quantities.

*These prices contract, spot $5 higher.

Scrap

Better Tone Evident in All Markets—Some Prices Advanced—Dealers Piling Tonnage

SLIGHT betterment evident last week is continued and in some instances quotations have been advanced, on better shipments. A significant feature is that some dealers are taking tonnage to lay down in their yards, which has been absent from the situation for some time. Decline seems to have been halted.

Chicago, Dec. 17.—Despite light consumer bookings of iron and steel scrap, a slightly firmer tone is evident. Those holding prepared scrap are demanding higher prices. Dealer interests, buying against a heavy melting steel order for a larger steelworks, have paid $13.25, although the quoted range remains at $12.50 to $13. Steelworks melters now are using more of their surplus hot metal and less scrap, although more leeway is given shippers in moving scrap against contract orders than a few weeks ago. Higher prices are being obtained in small sales of 2 and 3-foot rail ends, and buyers of specialty grades have paid higher prices recently. Collection of scrap is proceeding at about the normal rate for this season, but it is recognized that closed winter weather might reverse this position shortly. Some scrap on railroad lists has been sold on a basis comparable to $14 for melting steel.

Boston, Dec. 17.—For the first week in two months prices for scrap developed no change. Pennsylvania mills continue to hold up shipments on contracts. The limited tonnages disposed of in the past week were mainly for

Iron and Steel Scrap Prices

Corrected to Tuesday noon. Gross tons delivered to consumers, except where otherwise stated.

Steel Works Scrap

HEAVY MELTING STEEL

Birmingham	10.50 to 13.50
Boston, dealers	9.50 to 10.00
Boston, No. 2	10.50 to 11.00
Buffalo, No. 1	14.00 to 14.50
Buffalo, No. 2	12.50 to 12.75
Chicago	12.50 to 13.00
Cincinnati, deal.	12.00 to 12.50
Cleveland, No. 1	13.00 to 13.50
Cleveland, No. 2	12.50 to 13.00
Detroit, No. 1 deal.	12.00 to 12.50
Detroit, No. 2 deal.	9.75 to 10.25
East Pa., del. mill	14.50
N. Y., deal. R. R.	11.50 to 11.85
N. Y., deal. yd.	7.75 to 8.00
Pittsburgh, No. 1	15.00 to 15.50
St. Louis, No. 1	13.00 to 13.50
Valleys, No. 1	15.00 to 15.50

COMPRESSED SHEETS

Buffalo (dealers)	12.50 to 12.75
Chicago	11.50 to 12.00
Cleveland	13.50 to 14.00
Detroit, dealers	11.50 to 12.00
E. Pa. new mat.	13.00 to 13.50
Pittsburgh	15.00 to 15.50
Valleys	14.50 to 15.00

BUNDLED SHEETS

Buffalo	9.50 to 10.00
Cincinnati, deal.	10.25 to 10.75
Cleveland	11.00 to 11.50
Eastern Pa.	11.50
Pittsburgh	14.00 to 14.50
St. Louis	9.00 to 9.50

SHEET CLIPPINGS LOOSE

Chicago	7.50 to 8.00
Cincinnati	8.00 to 8.50
Detroit, dealers	8.50 to 9.00
St. Louis	9.00 to 9.50

STEEL RAILS, SHORT

Birmingham	13.00 to 14.00
Boston, dealers	8.50 to 8.75
Buffalo	17.50 to 18.00
Chicago (3 feet)	15.75 to 16.25
Chicago, 2 ft. and under	17.50 to 18.00
Cincinnati, deal.	17.50 to 18.00
Detroit, dealers	16.00 to 16.50
Pittsburgh (3 ft.)	18.00 to 19.00
Pittsburgh, 2 feet and under	18.50 to 19.50
St. Louis	17.50 to 18.00

STOVE PLATE

Birmingham	11.00 to 12.00
Boston consumers	11.00 to 11.50
Buffalo	12.00 to 12.25
Chicago, net	10.25 to 10.75
Cinn., deal., net	8.75 to 9.25
Detroit, net, deal.	9.00 to 9.50
Eastern Pa.	11.00
N. Y., deal., mill	7.75 to 8.00
St. Louis	12.00 to 12.50

COUPLERS, SPRINGS

Buffalo	17.00 to 17.50
Chicago	15.50 to 16.00
Eastern Pa.	19.50 to 20.00
Pittsburgh	20.00 to 20.50
St. Louis	14.50 to 15.00

ANGLE BARS—STEEL

Chicago	15.25 to 15.75
St. Louis	13.50 to 14.00

LOW PHOSPHORUS

Buffalo, billets and bloom crops	17.50 to 18.00
Cleve. billet and bloom crops	17.00 to 17.50
Eastern Pa.	21.00 to 22.00
Pitts. billet and bloom crops	20.50 to 21.00
Pitts. sheet bar crops	20.50 to 21.00

FROGS, SWITCHES, GUARDS

Chicago	13.00 to 13.50
St. Louis	14.00 to 14.50

SHOVELING STEEL

Chicago	12.50 to 13.00
Cleveland	11.00 to 11.50
St. Louis	13.00 to 13.50

Iron Mill Scrap

RAILROAD WROUGHT

Birmingham	10.00 to 11.00
Boston, dealers	10.50 to 10.75
Buffalo, No. 1	11.00 to 11.50
Buffalo, No. 2	14.00 to 14.50
Chicago, No. 1	13.20 to 13.75
Chicago, No. 2	12.50 to 13.00
Cincinnati, No. 2	12.00 to 12.50
Eastern Pa.	16.00 to 16.50
N. Y., No. 1 deal.	12.00 to 12.50
Pittsburgh, No. 2	15.00 to 15.50
St. Louis, No. 1	12.25 to 12.75
St. Louis, No. 2	13.00 to 13.50

SPECIFICATION PIPE

Boston	8.50 to 9.00
Eastern Pa.	14.00
New York, deal.	9.25

BUSHELING

Buffalo, No. 1	12.50 to 12.75
Chicago, No. 1	10.75 to 11.25
Cinn., No. 1 deal.	10.00 to 10.50
Cinn., No. 2	6.50 to 7.00
Cleveland, No. 1	12.00 to 12.50
Cleveland, No. 2	9.25 to 9.75
Detroit, No. 1 new deal.	10.50 to 11.00
St. Louis, No. 1	9.25 to 9.75
Valleys, new No. 1	14.00 to 14.50

MACHINE SHOP TURNINGS

Birmingham	6.00 to 7.00
Boston, dealers	5.50 to 6.00
Buffalo	9.00 to 9.50
Chicago	6.50 to 7.00
Cincinnati, deal.	8.00 to 8.50
Cleveland	9.00 to 9.50
Detroit	8.00 to 8.25
Eastern Pa.	11.00
New York, deal.	7.00 to 7.50
Pittsburgh	10.00 to 10.50
St. Louis	6.75 to 7.25
Valleys	10.50 to 11.00

MIXED BORINGS TURNINGS

For Blast furnace use

Boston, dealers	5.50 to 6.00
Buffalo	11.00 to 11.50
Cincinnati, deal.	8.25 to 9.25
Cleveland	9.50 to 10.00
Detroit, dealers	9.00 to 9.50
Eastern Pa.	11.00
New York, deal.	7.00 to 7.50
Pittsburgh	10.50 to 11.00

CAST IRON BORINGS

Birmingham, chem.	13.00 to 13.50
Birmingham, plain	6.00 to 7.00
Boston, chem.	9.00 to 9.50
Boston, dealers	6.00 to 6.10
Buffalo	11.00 to 11.50
Chicago	9.25 to 9.75
Cincinnati, deal.	8.25 to 8.75
Cleveland	9.50 to 10.00
Detroit, dealers	9.00 to 9.50
Eastern Pa.	11.50
Eastern Pa., chem.	14.50
New York, deal.	7.00 to 7.50
Pittsburgh	10.50 to 11.00
St. Louis	9.25 to 9.75

PIPE AND FLUES

Cincinnati, deal.	9.00 to 9.50

RAILROAD GRATE BARS

Buffalo	11.00 to 11.50
Chicago, net	11.50 to 12.00
Cincinnati	9.50 to 10.00
Eastern Pa.	11.00
New York, deal.	7.50 to 8.00
St. Louis	11.50 to 12.00

FORGE FLASHINGS

Boston, dealers	8.00 to 8.50
Buffalo	12.50 to 12.75
Cleve. over 10 in.	11.00 to 11.50
Detroit	11.00 to 11.50

FORGE SCRAP

Boston, dealers	8.00 to 8.50
Chicago	17.25 to 17.75
Eastern Pa.	13.50 to 14.00

ARCH BARS AND TRANSOMS

Chicago, net	17.25 to 17.75
St. Louis	19.00 to 19.50

Iron, Steel Works Scrap

AXLE TURNINGS

Boston, deal.	6.75 to 7.00
Buffalo	13.50 to 14.00
Chicago steelworks	10.50 to 11.00
Cleveland	12.00 to 12.50
Eastern Pa.	13.50
Pittsburgh	14.50 to 15.00
St. Louis	10.00 to 10.50

STEEL CAR AXLES

Birmingham	17.00 to 17.50
Boston, ship point	15.00 to 15.50
Buffalo	17.50 to 18.00
Chicago	17.65 to 18.20
Eastern Pa.	20.00 to 21.00
Pittsburgh	20.50 to 21.00
St. Louis	18.50 to 19.00

SHAFTING

Boston, ship point	13.50 to 14.00
Chicago	16.50 to 17.10
Eastern Pa.	19.00
New York, deal.	14.00 to 14.50
St. Louis	17.50 to 18.00

Iron Foundry Scrap

CAR WHEELS

Birmingham, iron	11.00 to 12.00
Boston, iron	14.00 to 14.50
Buffalo, iron	12.50 to 13.00
Buffalo, steel	17.50 to 18.00
Chicago, iron	14.00 to 14.50
Chi., rolled steel	17.00 to 17.50
Cincinnati	12.00 to 12.50
N. Y., iron, deal.	10.50 to 11.00
Pittsburgh, iron	14.50 to 15.00
Pittsburgh, steel	20.00 to 20.50
St. Louis, iron	13.75 to 14.25
St. Louis, steel	16.00 to 16.50

NO. 1 CAST SCRAP

Birmingham, cup	12.00 to 13.00
Buffalo	14.00 to 14.50
Boston, textile	14.00 to 14.50
Chicago, mach.	15.10 to 15.70
Chicago, railroad	14.00 to 14.55
Chicago, agri.	12.35 to 12.90
Cincinnati, mach. cupolas, gross	18.25 to 18.75
Cleveland, cupola	15.00 to 15.50
Detroit, net, deal.	11.50 to 12.00
East Pa., cupola	16.00
N. Y. cup. deal.	10.85
N. Y., del. local foundries	15.00
Pittsburgh, cupola	14.50 to 15.00
San Fran., del.	13.50 to 14.00
Seattle	14.50 to 14.75
St. L. No. 1 mach.	14.50 to 15.00
St. Louis, No. 1	14.00 to 14.50

HEAVY CAST

Boston	10.50 to 11.00
Buffalo, breakable	10.25 to 10.75
Cleve., breakable	12.00 to 12.50
Detroit, auto, net dealers	12.00 to 13.00
Detroit, break. deal	9.50
Eastern Pa.	14.00 to 14.50
New York, deal.	9.75 to 10.50
Pittsburgh	11.50 to 12.00

MALLEABLE

Boston, railroad	18.50 to 19.00
Buffalo	17.00 to 17.50
Chicago, agri.	13.75 to 14.25
Chicago, railroad	15.50 to 16.00
Cinn., R. R. deal.	15.25 to 15.75
Cinn., agri., deal.	14.25 to 14.75
Cleveland, rail	17.00 to 17.50
Detroit auto deal.	14.50 to 15.00
St. Louis, rail	14.00 to 14.50

Miscellaneous Scrap

RAILS FOR ROLLING

5 feet and over

Birmingham	13.50 to 14.50
Boston	10.50 to 11.00
Buffalo	14.00 to 14.50
Chicago	14.50 to 15.00
Eastern Pa.	16.50 to 17.00
New York	10.50 to 11.00
St. Louis	14.50 to 15.00

LOCOMOTIVE TIRES

Chicago, cut	17.25 to 17.75
St. Louis, No. 1	14.50 to 15.00

LOW PHOS. PUNCHINGS

Chicago	14.75 to 15.25
Pittsburgh	18.50 to 19.00

consumption in New England, while some buying was done for reserves.

New York, Dec. 17.—For the first week in some time scrap dealers' buying prices have shown little change. In fact, the market appears to be marking time, with little fresh consuming demand and with little expected over the next few weeks. The movement in cast grades appears particularly slack. Some leading consumers continue to hold up shipments on back orders. Owing to adverse seasonal influences, dealers are making little effort to stimulate trading by offering concessions.

Philadelphia, Dec. 17.—Fair activity is found in the iron and steel scrap market but only small and moderate lots are involved. Some heavy melting steel in medium tonnages went at $14.50, delivered. Prices generally are unchanged.

Buffalo, Dec. 17.—Scrap sales have been lacking during the past week, except for a contract for stove plate for local delivery, between $12 and $12.25. Nothing else is moving or wanted by consumers. Prices continue nominal.

Cleveland, Dec. 17.—Iron and steel scrap continues dull. Mill shipments are still confined to blast furnace scrap for which dealers are paying around $9.50. No. 1 heavy melting steel has eased to $13 to $13.50. No. 2 steel is 50 cents less. Sale of a tonnage of No. 1 steel to a Canton consumer is reported at $14.50. Sale of another tonnage is reported at $15.50 to a Sharon interest. Shipments to the Valley district have increased, due to mere active open-hearth operations. Dealers are taking advantage of low prices and are piling material in yards. Present supplies are reported to be the heaviest in many months.

Cincinnati, Dec. 17.—Dealers in iron and steel scrap are maintaining quotations for heavy melting steel at $12 to $12.50, with other prices nominal. Although quiet, the market has assumed a steadier tone.

Detroit, Dec. 17.—A slight increase has been registered in borings and turnings and No. 2 heavy melting steel. Releases on shipments to Ohio furnaces have strengthened the market. Demand for borings and turnings is improving.

St. Louis, Dec. 17.—Demand for iron and steel scrap is confined to a few specialties, and the aspect is stagnant. Some melters are well supplied, and those needing material are taking only immediate needs. Prices remain unaltered, but on a number of items standing quotations hardly represent the condition of the market, as there have been no transactions upon which to predicate actual values.

Birmingham, Ala., Dec. 17.—Sluggishness is still noted in iron and steel scrap with steels showing the greater activity. Iron material is almost lifeless. Prices are unchanged but nominal.

Toronto, Ont., Dec. 17.—Improvement in demand features business in iron and steel scrap. Mills show more interest and demand for heavy melting steel and turnings is better. Deliveries against contracts are also steady. Most of the improvement, however, is in steel grades.

Pittsburgh, Dec. 17.—Prices of steel scrap are firmer but with the exception of compressed sheets are not quotably higher than last week. Sheets are up 50 cents to a par with heavy melting steel at $15 to $15.50. A moderate tonnage of the latter grade has been sold to a local mill at $15.50, but buying still is not general. Scrap is not plentiful and dealers find difficulty in covering below present consumer quotations. Additional sales of specialties have been made at $20.50.

Canadian Scrap

Dealers' Buying Prices

MONTREAL

Per Gross Ton

Iron axles	$22.00
Steel axles	20.00
Car wheels	16.00
Stove plate	13.00
Wrought pipe	6.00
Turnings	6.50
Heavy melting steel	8.00

TORONTO

Steel axles	15.00
Iron axles	17.00
Heavy melting steel	9.50
Turnings	7.50
No. 1 mach. cast (net)	16.00
Malleable (net)	12.50

Semifinished Steel

Billets and Slabs Reduced to $34 in Some Districts

SEMIFINISHED STEEL PRICES, PAGE 1582

Pittsburgh, Dec. 17.—Semifinished steel continues in a slow market. With the exception of an occasional sale involving only a limited tonnage, there is little activity. Specifications are slower than a month ago and little forward buying is looked for before a number of weeks. Prices still lack tests. Producers continue to quote $35 on what small tonnage of billets, slabs and sheet bars is going and have named this price to buyers seeking first quarter contracts. Wire rods and forging billets remain $40, with skelp generally 1.85c, Pittsburgh.

Youngstown, O., Dec. 17.—Negotiations for semifinished steel for first quarter are slow. The important local makers have followed the lead of other eastern Ohio producers and have put billets, slabs and sheet bars down to the one price level of $34, Pittsburgh and Youngstown.

Cleveland, Dec. 17.—The price of sheet bars, billets and slabs for first quarter has been set at $34, base, Cleveland, or Youngstown, by the leading merchant producer here which has opened its books for that period. Current shipments also are being billed at these figures, although fourth quarter contracts were taken at $35. Sheet bars generally were marked down to $34 a week ago by some producers. Specifications show some improvement, and the Cleveland maker is operating seven of its 14 open hearths.

Philadelphia, Dec. 17.—Consumers in this district have renewed semifinished steel contracts for first quarter at unchanged prices. These are $40, base, Pittsburgh, for wire rods; $35 for rerolling billets and $40 for forging billets.

Chicago, Dec. 17.—Shipments of semifinished material are in the lowest volume of the year. Several consumers in this district have some stock piles in their yards. Billets, 4 x 4-inch base, are quoted at $36, Chicago. Forgings billets now are quoted $41, base, instead of $42. Wire rods are $40, Pittsburgh-Cleveland, or $41, Chicago.

Operating Rates

Buffalo and Valley Improve, Chicago Remains Unchanged

Pittsburgh—Ingot production is off slightly, between 60 and 65 per cent. Operations of finishing mills generally are unchanged with increases to offset shutdowns over the Christmas week. Sheet schedules are unchanged at about 55 per cent, and tin plate 75 per cent. Strip mills are slightly more active, with hot mills at 45 to 50 per cent and cold mills from 30 per cent downward. Pipe production is lower at 45 to 50 per cent.

Chicago—Ingot output shows no change at about 65 per cent. Twenty-two of 36 steelworks blast furnaces are active. Sheet mill operations are 50 to 60 per cent. Rail mills are operating about 85 per cent. The ingot rate compares with about 80 per cents a year ago.

Buffalo—There is another increase in ingot production here this week. There were 21 furnaces making steel on Monday with 16 idle. All larger mills were on single turn except one on double turn. One steelworks is running four days a week, others five and a half to six.

Youngstown, O.—Some improvement in steel mill operations is seen this week. On the whole, independent plants are working 50 per cent and Steel corporation subsidiaries 60 per cent.

Fewer than 20 independent open hearths are active this week out of 51 but the rate of bessemer output has been increased, due to improved wrought pipe business. Independent tin plate mills are 60 and strip around 50 per cent. Independent sheet mills have 66 units active out of 120, a slight gain from last week. Independent bar mills are around 45 per cent with Carnegie Steel Co. about 60 per cent. The Girard puddle mill continues at 60 per cent.

Walter Frank Dies

Walter Frank, 35, service manager of the bar department, Interstate Iron & Steel Co., Chicago, died recently. For several years he was with the Republic Iron & Steel Co., in its Chicago office and at Moline, Ill.

Bars

Specifications Make Slight Gain —Demand Seasonally Light but Improvement Is Noted

BETTER demand is seen in steel bars and while operations are kept at a moderate level and deliveries are prompt the improvement is substantial. Agricultural implement manufacturers are steady buyers and make up in a measure for automotive dullness. First quarter contracts hold little attraction for buyers. Prices are steady at the existing levels.

BAR PRICES, PAGE 1581

Chicago, Dec. 17.—Fairly liberal releases from the farm implement and tractor industry comprise one of the most cheerful aspects of the bar market. While some current releases specify delivery after the holidays, these orders are furnishing tonnage for mills in the absence of other substantial orders. Implement releases now include material for harvesting machinery as well as tillage tools. While first quarter tonnage contracted thus far is relatively light, except in railroad material, most important consuming lines report a favorable outlook. One road-building equipment maker is booked up for four months. Bar mill specifications maintain a fairly uniform flow. One producer reports specifications in the week just closed about double those of the preceding period. Almost prompt deliveries can be made in bar mill products. Operations as a whole are 60 to 65 per cent. Alloy bar mill operations are irregular at 40 to 55 per cent. One alloy producer has only two of his eight open hearths active. Soft steel bar sales are based on 2.00c, Chicago.

New York, Dec. 17.—With prices for first quarter unchanged, there is little buying impetus in steel bars. Prices are 1.90c with some small business still going at 1.95c, base, Pittsburgh.

Pittsburgh, Dec. 17.—The slight improvement in specifications for hot-rolled merchant bars, noted a short time ago, continues. Total demand still is seasonally light but compares favorably with the poor buying during most of November. Some automotive releases are included in recent orders although the improvement in activity from that industry still is slow. Interest in first quarter tonnage is light and contracting by large buyers is deferred. Producers report the market as firm at 1.90c, Pittsburgh.

Cleveland, Dec. 17.—Merchant steel bar specifications have only increased a trifle during the past two or three weeks. The general tendency seems to be to hold up orders until after the holidays and inventories. A few large orders for automotive purposes have come through and are being worked upon. Some orders are received specifying shipment on or after Jan. 2. Outside mills quote 1.90c, base, Pittsburgh or Cleveland. Cleveland producers have quoted 1.85c, Cleveland.

Philadelphia, Dec. 17.—Steel bar contracting has been done here the past week with the market firm at 1.90c, base, Pittsburgh. Specifications are less than the November average but exceed December of last year.

Eastern Jobbers Meet

Philadelphia, Dec. 17.—Philadelphia jobbers held their annual dinner here last week. The meeting also was attended by eastern Pennsylvania, southern New Jersey, Delaware and Maryland jobbers. On this occasion two new Philadelphia jobbers were welcomed to the ranks, Joseph T. Ryerson & Son Inc., and Phillips Bros.

Less Speculation, More Work, Schwab's Idea

New York, Dec. 17.—Charles M. Schwab, presiding at the recent thirty-first annual dinner of the Pennsylvania society here, appealed to American people to stop speculating in the stock market and go back to work in their own business "and make money in a big way."

He presented Henry Ford, chief guest of honor, with the society's gold medal. "We are not honoring Mr. Ford," he said, "because he has achieved such success as a manufacturer. He was the first man to promulgate the theory that for real prosperity in this country, the working people of America should be prosperous. He not only promulgated that theory; he put it into practice. The rest of us followed."

Imports of scrap iron and steel into Poland for nine months of 1929 were 457,917 tons, compared with 372,458 tons for all of 1928.

Plates

Market Is Slow—Mills Giving Prompt Shipment, Material Going Directly Into Consumption

A QUIETER tone is noted in the plate market, specifications from leading consumers and miscellaneous lines having slowed up. Material is going directly into consumption, orders being mainly for prompt shipment, and mills having depleted their backlogs. Production in the Chicago district averages 65 to 70 per cent. Contracting for first quarter continues slow.

PLATE PRICES, PAGE 1581

Chicago, Dec. 17.—All plate mill tonnage specified apparently is going directly into consumption. Sheared plate mills are in better position than universal, due largely to the shipments of skelp and plate to A. O. Smith Corp., Milwaukee, which is operating one unit of its pipe plant. Plate mill operations are 65 to 70 per cent with deliveries prompt to four weeks. About 1200 tons was specified for Gulf coast oil refinery tanks in West Texas. No new inquiries have appeared for tankage from the western and southwestern oil fields. Plate prices average $2 a ton above the Pittsburgh quotation with barely enough forward tonnage to offer a test.

New York, Dec. 17.—Plates generally are holding at 2.00c, Coatesville, with some small lots still going at 2.05c. Quoting of these prices for first quarter is indicated. Demand continues slack, with deliveries around a week to 10 days. Railroad demand so far this month has been light, but is expected to show a gain, particularly for locomotive requirements. The Wabash closed on 25 locomotives with Baldwin Locomotive Works within the past week and between 50 and 75 additional locomotives are expected to be placed before the close of this month. The Chesapeake & Ohio contemplates the purchase of 100 locomotives but has not as yet issued specifications. Neither has it issued specifications on its proposed list of some 11,000 cars. Shipbuilding is in a temporary lull, despite a vast amount of contemplated work. Eighteen miles of 48-inch pipe are involved in a $20,000,000 municipal filtration plant project for Rochester, N. Y. However, pipe specifications are not likely to be issued for five or six months.

Pittsburgh, Dec. 17.—Plate business continues fairly active for this period largely through a well sustained demand for miscellaneous purposes and the activity in freight car building. Two tank jobs received by a local fabricator involve 1800 tons. Barge builders are lighter buyers, with backlogs nearly depleted and incoming

business light. Prospects for the first quarter in barges are regarded as good, however. Little line pipe business is in the offing. Contracting for first quarter continues slow but the market is fairly well maintained at 1.90c, Pittsburgh.

Philadelphia, Dec. 17.—Plate orders continue fair, enabling eastern mills to operate at about 60 per cent. Principal demands come from the railroads. Current prices continue 2.00c to 2.05c, base, Coatesville, with occasional differentials on large tonnages. Carnegie Steel Co. is expected to supply 10,000 tons of plates, shapes and bars for two tankers which Standard Oil interests placed recently with the Sun Shipbuilding & Dry Dock Co.

Cleveland, Dec. 17.—Moderate size orders predominate in plates. These serve various purposes, although ship repair work takes a leading part. Some plates weighing 18¼ tons apiece have been ordered by heavy machinery builders with 12 per cent manganese content specified. These are to resist abrasive action and while they cannot be machined, they can be punched. About 1500 tons of plates will be bought for boilers and fire boxes for the Missouri Pacific locomotives recently awarded Lima Locomotive Works. Tank and container manufacturers' orders are only fair. A few first quarter contracts have been written at the 1.90c, Pittsburgh base figure, but there is no rush to cover.

CONTRACTS PLACED

1600 tons, penstock, British Columbia Electric railway, Vancouver, B. C., to Vancouver Engineering Works.
900 tons, tanks, Milwaukee, to Pittsburgh-Des Moines Steel Co.
900 tons, tanks, Jericho water district, Jericho, N. Y., to Pittsburgh-Des Moines Steel Co.
900 tons, tanks, Milwaukee; to Pittsburgh-Des Moines Steel Co.
900 tons, tanks, Jericho water district, Jericho, N. Y.; to Pittsburgh-Des Moines Steel Co.
230 tons, Cedar River pipeline No. 2, Seattle, to Beall Tank & Pipe Co.

CONTRACTS PENDING

196 ton, 20-inch shore pipe for United States Engineer office, Sacramento, Calif. Bids received.

$250,000,000 Expansion for Steel Corp.

New York, Dec. 17.—An expansion program covering a three-year period and calling for an expenditure of more than $250,000,000 is planned by the United States Steel Corp., to be financed entirely out of earnings and surplus, it is reported here. Although all of the important plants of the Steel corporation will benefit from the outlays, the largest single expenditure will be made for the Illinois Steel Co. The capacity of all subsidiary plants is now about 24,000,000 tons of steel ingots, representing approximately 40 per cent of the steel producing capacity of the country. Extensive improvements are also planned for the Tennessee Coal, Iron & Railroad Co.

Pipe

Pressure Pipe Inquiries Appear—Private Interest Wanes—Milwaukee Wants 8000 Tons

MUNICIPALITY pipe buying is commencing. Milwaukee asks bids on 8000 tons. Eastern bidders have inquiries for 6000 tons including requirements of two New England cities. Youngstown, O., placed 1700 tons of 30-inch. United Gas Improvement Co. takes bids on 3000 tons. Cast pipe prices fairly firm. Steel pipe demand declines in all grades.

PIPE PRICES, PAGE 1582

New York, Dec. 17.—Public utility companies are feeling out the market for first half cast pipe requirements. Inquiries have been made for about 6000 tons, including six months' requirements for two New England cities. A 1700-ton lot was sold in this district for Youngstown, O., installation. Some type buyers for utilities will delay placing contracts until January. Current business still is largely in carload lots. New York City is expected to place some business early in the year. Prices are unchanged. Foundries operate 60 to 65 per cent, mostly on larger sizes.

Boston, Dec. 17.—Private buying of pipe in smaller sizes represents a good volume. Municipal lettings, however, are negligible although local utilities are expected to purchase shortly. Prices continue firm.

Pittsburgh, Dec. 17.—Pipe business continues to lag. The seasonal decline in merchant pipe demand has been accentuated by slowed down building operations compared with last year. Oil drilling is slower in several districts and seamless casing demand is less active. Locomotive and boiler tube business remains fairly good but mechanical tubing shows little improvement. The line pipe market continues quiet with new inquiries and awards both lacking. Operations are lower at 45 to 50 per cent.

Cleveland, Dec. 17.—All pipe purchases by jobbers involve small amounts. Both mill supply and plumbers' supply houses are paring down their stocks for inventories. Pipe mill operation stands at about 50 per cent. Tubular orders soon will be distributed for the National Town and Country clubhouse here and a large order is expected from the Standard Oil Co. of Ohio, East Ohio Gas building, here, for its $2,750,000 expansion at Findlay, O., and elsewhere.

Chicago, Dec. 17.—One of the most important inquiries for pressure pipe in many weeks is for the Milwaukee waterworks department, comprising 8000 tons of 6, 8, 12 and 16-inch water main, bids to close Dec. 24. Public utilities are feeling out the market and taking figures on preliminary estimates of their programs. Occasional carload business is reported. Prices now are nominal in the absence of active business.

Birmingham, Ala., Dec. 17.—Lettings show little improvement in numbers. Greater tonnages will be requiried during 1930 for installations now planned. Production of pressure pipe is down to 40 to 50 per cent capacity.

CONTRACTS PLACED

1700 tons, 30-inch class B, for Youngstown, O., to United States Pipe & Foundry Co.
293 tons, 6 to 10-inch Class B, improvement La Mesa Colony, San Diego, Calif., to Miracle Construction Co.

CONTRACTS PENDING

8000 tons of pipe and 600 tons of castings for Milwaukee water department: 500 tons 6-inch, 3500 tons 8-inch, 2500 tons 12-inch, 1500 tons 16-inch, 500 tons special castings, 100 tons class D offset castings, 4 to 16-inch and 50 hydrants. Bids close Dec. 24.
3000 tons, 4 to 12-inch, for eastern properties, United Gas Improvement Co., Philadelphia.
650 tons, 6 to 24-inch class B, for Manchester, N. H., water department.
350 tons, 6 to 24-inch class B, for Portland, Me., water district.
140 tons, 4 to 8-inch class B, West Salem, Oreg.; bids Dec. 19.
139 tons, 4 to 10-inch class 150, Modest, Calif.; United States Pipe & Foundry Co. low bidder.

STEEL PIPE

1000 tons, wrought steel pipe, for Delaware, Lackawanna & Western railroad; bids open Dec. 27.

Hoover's Construction Appeal Gets Action

Washington, Dec. 17.—A preliminary survey by the new division of public construction, just created in the department of commerce at the request of President Hoover, reveals widespread, prompt and efficient mobilization of effort to expedite public construction, in response to President Hoover's appeal for the co-operation on the part of Governors, and other public officials, according to Secretary of Commerce, Lamont.

The newly organized division, under direction of Dr. John M. Gries, serves as a clearing house of information on methods and plans. In general, it is helping to co-ordinate the efforts of the federal government departments and of state and local governments in their programs to help to stabilize business and employment conditions by speeding up construction projects.

State governors, in response to telegrams from President Hoover, have assumed responsibility for carrying out the idea in their own states, and for encouraging similar efforts on the part of county and municipal officials.

The new unit is also making an intensive study of federal government projects now under way or which can be put in motion within the next few months.

Facts on many phases of the problem are already in the hands of Dr. Gries as a result of the study of public works, by the division of building and housing of the department and the National bureau of economic research.

Sheets

Renewed Interest Shown By Some Leading Automotive Consumers —Sales and Shipments Light

AUTOMOTIVE manufacturers are showing more interest in the sheet market, and several large users have placed orders, mainly for rush shipment. Other lines do not indicate a desire to contract for first quarter, though inquiries are moderately active. Operations in the Pittsburgh district average 55 per cent, and in the Chicago district 50 to 60 per cent.

SHEET PRICES, PAGE 1581

Pittsburgh, Dec. 17.—Total sheet business shows little improvement over the rate of preceding weeks but there is renewed interest in tonnage on the part of automotive buyers. Orders have been placed for several leading interests and although tonnage does not indicate large production schedules in the immediate future, some of the material is for rush shipment and early consumption. Demand for other descriptions of sheets is fairly steady but the usual year-end lull is apparent and first quarter buying is slow to develop. Producers are not interested in contracts at present prices, believing that higher levels are not unlikely before the end of the first quarter. Current business generally is taken at 2.75c, Pittsburgh, for black sheets, 3.40c to 3.50c for galvanized, 2.35c and 2.20c for blue annealed sheets and plates, and 4.00c for autobody. Operations are unchanged in the Pittsburgh district at around 5 per cent.

Buffalo, Dec. 17.—There has been some improvement in sheet demand, especially for the full finished grade which has been selling slowly in the past 30 days. Operations have been increased from a 40 per cent average to 50 per cent. Price quotations continue steady.

New York, Dec. 17.—First quarter sheet buying is getting under way slowly, but with prices holding fairly steady at recently announced levels.

Galvanized sheet prices are quoted at 3.50c, Pittsburgh, with 3.40c in special cases. Black sheets are the firmest they have been in considerable time at 2.75c, Pittsburgh, although occasional shading of $1 is offered. Blue annealed plates are holding at $2.25, Pittsburgh, and blue annealed sheets at 2.35c.

Youngstown, O., Dec. 17.—Further releases of tonnages of various grades from automotive interests, with the added spur of quick deliveries, have expanded slightly sheet mill operations in this district. Quotations on all grades of sheets appear steady. Common black is 2.75c, Pittsburgh; galvanized, 3.40c to 3.50c; autobody, 4.00c, and gages 9 and 10 blue annealed, 2.20c, and No. 13 2.35c.

Chicago, Dec. 17.—Sheet orders largely comprise spot requirements to tide buyers over the rest of the year. While some first quarter contracting has been closed for black, galvanized and blue annealed sheets, the tonnage is small. Sales are in barely sufficient volume to test quotations. Inquiry for first quarter is moderately active. Operations for the district are 50 to 60 per cent. One hot mill unit has its Milwaukee plant down and is operating partially at Indiana Harbor. Mill prices for No. 24 black sheets are based on 2.85c, while No. 24 galvanized sheets are 3.50c to 3.60c, mills. Blue annealed sheets are unchanged at 2.30c for No. 10, and 2.45c, mills, for No. 13 gage.

Cincinnati, Dec. 17.—Several sheet consumers, out of the market recently, are again buying for immediate needs causing some improvement at district mills which are operating 60 to 75 per cent of capacity.

St. Louis, Dec. 17.—According to producers and distributors of sheets, the past several days have developed decided improvement in their business. The leading local producer is operating at 70 per cent of capacity in its sheet department. No change in prices has been noted.

Cleveland, Dec. 17.—Although some automotive releases have been received by several sheet producers, demand in general cannot be described as anything else but dull. What are known as specialties alone are active. Specifications are not sufficient to support more than 40 or 50 per cent operations. First quarter contracting has made little or no progress, customers having no concern about getting material when and as needed. In a few cases where higher finishes take several weeks in processing, specifications are being placed for shipment in January-February. Steel barrel makers are operating at low rates and consequently sheet shipments to them are limited. While some black sheets were sold at 2.60c for prompt shipment, the usual quotation, especially for next quarter is 2.75c, Pittsburgh. Galvanized are 3.40c, metal furniture and full finished 4.00c, and blue annealed from jobbing mills, 2.20c for No. 10 gage, but some continuous mills sell at 2.10c.

Philadelphia, Dec. 17.—Black sheets were sold here in the past week at 2.65c, base, Pittsburgh, and not in connection with the most desirable tonnage, so 2.65c to 2.75c now represents the market on one-pass cold rolled. Blue annealed sheet prices have not yet been tested. Galvanized sheets continue to be quoted at 3.35c to 3.40c.

Tin Plate

Mill Operations High—Pacific Coast Taking Shipments

TIN PLATE PRICES, PAGE 1582

Pittsburgh, Dec. 17.—Tin plate specifications continue fairly good for this period although business is steady rather than brisk. There is some urgency for shipments to the Pacific coast before cold weather becomes general but for eastern consumption demand is only average. Mill operations remain seasonally high at slightly better than 75 per cent, partly in anticipation of a complete shutdown of some plants during the Christmas week. Some additional contracting has been done, with the market continuing $5.35 per 100-pound base box, Pittsburgh.

Allegheny Region Need for Cars Heavier

Pittsburgh, Dec. 17.—Shippers in the district served by the Allegheny Regional Advisory board look for an increase of 4.3 per cent in the number of cars to be required for the movement of their products during the first quarter of 1930, compared with the first three months of this year. This was announced at the regular meeting of the board in Pittsburgh, Dec. 12. The district included in this region comprises western Pennsylvania, eastern Ohio, northern West Virginia and the Panhandle of Maryland.

The number of cars estimated to be required in the first quarter of next year is 1,038,303, an increase of 43,137 cars over the first quarter of 1929. The increase in shipments largely is ascribed to anticipated heavier activity in coal. A gain of 6.8 per cent is estimated in cars for this commodity. Iron and steel shippers expect approximately the same activity during the first quarter as a year ago.

Increases for other products include 5.6 per cent for petroleum, machinery and boilers 6.2 per cent, cement 8.3 per cent, agricultural implements 2.5 per cent, aluminum and its products 9.6 per cent, castings 5.3 per cent, and electrical goods 2.3 per cent.

Structural Shapes

Shape Awards Active Following Three Dull Weeks—55,000-ton Job Let At New York—Specifications Sustained—Prices Fairly Firm

LETTING to American Bridge Co. of Empire state building, New York, 55,000 tons, the largest individual building award on record, makes the aggregate of awards for the week 98,030 tons. This is the largest single week's total in five or more years. Included also are three jobs taking more than 6000 tons apiece and about 12 requiring 1000 to 2000 tons each. Philadelphia convention hall, 7000 tons, tops the list. Bridge work still is an important item in inquiries as well as lettings and an 18,700-ton subway approaches closing stage. Apartment house construction and office buildings show no decline. Mills report sustained specifications and 70 to 100 per cent schedules. Numerous fabricators operate full. Prices usually are based on 1.90c, Pittsburgh.

STRUCTURAL SHAPE PRICES, PAGE 1581

New York, Dec. 17.—Structural lettings continue heavy in New York territory. Large projects, up for several weeks, are about to be closed. December awards are running ahead of last year. Tonnage for buildings, exclusive of subway, bridges and such engineering projects, will top 1928 by more than 150,000 tons, according to monthly reports to the Structural Steel Board of Trade of New York. For 11 months 567,151 tons have been reported, against 458,259 tons during all of 1928. Subways and bridges offer an outlet for mounting tonnages. Apartment and office construction shows no let-up. Pending tonnage, on which early action is expected, is larger than a year ago.

Prices are unchanged and appear steadier. On unusually large projects, competition is keen. Shape mills are operating near capacity. Fabricating shops have full schedules.

Boston, Dec. 17.—A seasonal decline in building activity is indicated by a report of the department of labor and industry of Massachusetts. Unemployed members of building trade unions increased from 7400 in October to 8700 in November, equivalent to approximately 18 per cent of total membership of all unions reporting. Awards and inquiries have declined.

Philadelphia, Dec. 17.—Shape demand continues steady enabling eastern mills to operate 75 to 85 per cent. Prices show easiness and minimum figures are somewhat more in evidence. The eastern mill range now is quoted at 1.80c to 1.95c, base mill on standard shapes while the market delivered at Philadelphia is unchanged at 1.91c to 2.01c, these prices being shaded on particularly desirable tonnages.

Pittsburgh, Dec. 17.—Specifications for plain structural material are slightly smaller than a month ago, but aggregate business remains seasonally high. Most fabricators are booking new business at about the rate of shipments and are figuring on a good volume of new work. Backlogs are fair and prospective work is favorable. Recent awards have involved only small tonnages. The third section of the Connellsville extension of the Pittsburgh & West Virginia railroad will involve one large bridge, four smaller bridges and several steel viaducts. The general contract has been awarded the Vang Construction Co. The market on plain material continues 1.90c, Pittsburgh.

Cleveland, Dec. 17.—In connection with much of the large amount of projected construction work in this area, definite action will now be deferred until early in 1930. The only award of size during the past few days, 1400 tons for the National Town and Country clubhouse, has been temporarily held up, pending acceptance by the successful fabricator of the club's counter proposition. Highway bridges still are featured in demand. The trade believes industrial expansion will mount rapidly in 1930. Definite action is expected soon on the rebuilding or the Main street bridge. Specifications to mills are heavy. First quarter contracting at the 1.90c, Pittsburgh level is limited.

Chicago, Dec. 17.—Specifications for plain structural material hold up moderately well, and mill operations average about 70 per cent. Fresh awards totaled about 6000 tons, mostly outside the Chicago area. Not much structural work is approaching the active stage in the immediate Chicago district, but at outlying points prospects are more encouraging, totaling about 7000 tons. Public utility work and some government projects are now developing momentum. The award of approximately 1000 tons for the Inland Lime & Stone Co. plant at Manistique, Mich., has been postponed until next month. The base price of 2.00c, Chicago, applies for plain material sales.

Birmingham, Ala., Dec. 17.—One to two-day suspensions at Christmas and New Year will be made by steel fabricators here. Bookings warrant active operation. Orders last week included three from 125 to 400 tons. A few large lots may be placed this week.

Awards Compared

	Tons
Awards this week	98,030
Awards last week	22,567
Awards two weeks ago	24,403
Awards this week in 1928	22,561
Average weekly awards, 1928	39,082
Average weekly awards, 1929	41,921
Average weekly awards, Nov.	37,133
Total awards to date, 1928	1,994,223
Total awards to date, 1929	2,137,978

CONTRACTS PLACED

55,00 tons, Empire State building, Fifth avenue at Thirty-third and Thirty-fourth streets, New York, to American Bridge Co., through Starrett Bros., general contractors.

7000 tons, convention hall, Philadelphia, to Bethlehem Steel Co.

6270 tons, White river bridge, Indianapolis, for Cincinnati Union railroad, Cincinnati, to American Bridge Co.

6000 tons, addition, Royal York hotel, Toronto, Ont., to Dominion Bridge Co.

2000 tons, building, American Tobacco Co., Richmond, Va., to Richmond Structural Steel Co.

1700 tons, apartment, Park avenue and Eighty-ninth street, New York, to Hay Foundry & Iron Works.

1550 tons, Third street viaduct, St. Paul, to St. Paul Foundry Co.

1300 tons, apartment, East Seventy-second street, New York, to unstated fabricator.

1200 tons, addition, Bloomingdale store, New York, to National Bridge Co.

1200 tons, branch, Central Hanover bank, Greenwich and Jay streets, New York, to Hedden Iron Construction Co.

1200 tons, public school, No. 141, Brooklyn, N. Y., to Easton Structural Steel Co.

1100 tons, school No. 238, Brooklyn, N. Y., to Bethlehem Fabricators Inc.

1100 tons, branch, Central Hanover bank, Church and Franklin streets, New York, to Hedden Iron Construction Co.

1070 tons, hospital clinic building, New Haven, Conn., to Levering & Garrigues Co.

1000 tons, apartment, Amsterdam avenue and Seventy-ninth street, New York, to Harris Structural Steel Co.

1000 tons, Bridge, Connecticut River Power Co., Inwood, Vt., to McClintic-Marshall Co.

900 tons, office building, Montgomery street, San Francisco, to McClintic-Marshall Co.

830 tons, office building, First street, Phoenix, Ariz., to McClintic-Marshall Co.

765 tons, bridge, Baltimore & Ohio railroad, Ohio Junction, O., to Mt. Vernon Bridge Co.

700 tons, office building and stores, East Fifty-seventh street, New York, to Hedden Iron Construction Co.

500 tons, building for Phelps-Dodge Corp., Douglas, Ariz., to St. Louis Structural Steel Co.

500 tons, highway bridge at Troy, Mo., to Vincennes Bridge Co.

450 tons, telephone building, Mount Kisco, N. Y., to Hinkle Iron Co.

400 tons, school No. 224, Brooklyn, N. Y., to Bethlehem Fabricators Inc.

400 tons, boiler casing, power plant, Texas Gulf Sulphur Co., to Ingalls Iron Works Co.

400 tons, bridge, Coatesville, Pa., to American Bridge Co.

365 tons, sheds, Delaware, Lackawanna & Western railroad, Hoboken, N. J., to American Bridge Co.

345 tons, Grand river bridge, Lansing, Mich., to Bethlehem Steel Co.

300 tons, school, Elmira, N. Y., to Kellogg Structural Steel Co.

200 tons, building, Snap-on Wrench Co., Kenosha, Wis., to Milwaukee Structural Steel Co.

200 tons, cell house, state reformatory, Pontiac, Ill., to Mississippi Valley Structural Steel Co.

160 tons, building, Pacific Electric Mfg. Co., Carroll street, San Francisco, to Herrick Iron Works.
150 tons, warehouse extension, Birmingport, Ala., Mississippi-Warrior Service, government, to Southern Steel Works.
150 tons, stadium, Mt. Vernon, N. Y., to George A. Just Co.
135 tons, plant addition, Carborundum Co., Niagara Falls, N. Y., to McClintic-Marshall Co.
135 tons, McMahon memorial, 112th street, New York, to Grant Iron Works.
130 tons, Menonite hospital, Bloomington, Ill., to Mississippi Valley Structural Steel Co.
125 tons, mercantile structure, Atlanta, Ga., to Southern Steel Works.
100 tons or more, factory addition for Globe-Union Electrical Mfg. Co., Milwaukee, to Worden-Allen Co.

CONTRACTS PENDING

18,700 tons, elevated (corrected tonnage), route 109, section 3, New York.
3000 tons, administration building, Southwestern Bell Telephone Co., San Antonio, Tex.
2500 tons, first quarter requirements, shapes, plates and bars, Norfolk & Western railroad; 2500 tons, post office, Baltimore.
2200 tons, plant addition, Viscose Co., Parkersburg, W. Va. Bids in.
2165 tons, Home of Incurables, Third avenue and 181st street, New York.
1700 tons, Union League club building, Park avenue and Thirty-seventh street, New York. bids opened Dec. 19.
1500 tons, headquarters building, Cleveland board of education; sketches by Walker & Weeks, architects, approved Dec. 16.
1500 tons, rebuilding Main street bridge, Cleveland; early action expected.
1500 tons, Johns Hopkins building, Baltimore.
1500 tons, power house, Northern States Power Co., Granite Falls, Minn.
1400 tons, clubhouse, National Town and Country Club, Cleveland; reported award to McClintic-Marshall Co., held up for approval of building committee.
1350 tons, apartment, Greenwich avenue and Horatio street, New York; noted last week as 1000 tons.
1300 tons, apartment, Seventy-second street, New York.
1200 tons, second section, Eight street subway, Philadelphia.
1200 tons, Henry avenue bridge, Philadelphia.
1000 tons, powerhouse, Byllesby Engineering & Management Corp., Oklahoma City, Okla.
900 tons, two bridges, Pennsylvania railroad, New Brunswick, N. J.
650 tons, addition, West Side Tennis club, Forest Hills, New York.
600 tons, United States custom house at Denver.
500 tons, Blair building, Lancaster, Pa.; general contract to John Wickersham.
500 tons, two bridges, Baltimore.
400 tons, sintering plant for unstated interests at Chisholm, Minn.
300 tons, garage, Gimbel Bros., Philadelphia.
250 tons, Seton high school, Baltimore.
235 tons, repairs to Croton watershed bridges, New York.
100 tons, suspension footbridge, Nickel Plate railroad, Kinsman road, Cleveland; bids in Dec. 14.
Unstated tonnage, warehouse, McCann Storage Co., Yonkers, N. Y.
Unstated tonnage, Otis Steel Co.'s expansion program at Cleveland; plans to come out early in 1930.
Unstated tonnage, church, chapel, and school White Plains, N. Y.
Unstated tonnage, expansion program, Sherwin, Williams & Co., Cleveland; plans to come out early in 1930.

Foster Bolt Directors To Ratify Merger Later

Cleveland, Dec. 17.—Directors of the Foster Bolt & Nut Mfg. Co., Cleveland and Chicago, met here today and full ratification of its purchase by the Lamson & Sessions Co. on an exchange of stock basis is expected within a day or two. The Foster company, organized by A. M. Foster and the late O. E. Foster of Buffalo, about 20 years ago, transacts about $2,500,000 of business annually.

Concrete Bars

Awards More Numerous—Year's Windup Good—Pending List Heavy

SEVERAL awards in the 300 to 800-ton range make for improvement. A number of smaller jobs are being rushed through, cold weather exercising a decreasing influence. An 800-ton convention hall was let at Philadelphia and work for the navy yards there, also awarded, involves 750 tons. Pending inquiries are topped by a 1000-ton rubber plant in New Jersey.

REINFORCING BAR PRICES, PAGE 1581

New York, Dec. 17.—Concrete reinforcing bars are quoted steady 1.95c to 2.00c, Pittsburgh, and 2.70c to 2.90c, out of New York warehouse. Sales are seasonally slow, but pending tonnage is heavier. Several large jobs will be closed soon after Jan. 1. United States Rubber Co. plans another unit at Passaic, N. J., 1000 tons. A building at Princeton, N. J., calls for about 150 tons. Mills operate about 70 per cent and deliveries are prompt.

Boston, Dec. 17.—Comprising several small contracts concrete bar producers disposed of 200 or more tons last week. Several projected jobs are slow to get under way. The foundation of the new federal building may be started sooner than expected.

Pittsburgh, Dec. 17.—Tonnage in concrete reinforcing bars is off seasonally although the current volume is fair for this period. Pending work is slow to close. Prospects for the first quarter are favorable. Local awards are small. The market continues 2.20c, Pittsburgh, for cut lengths and 1.95c for stock lengths.

Buffalo, Dec. 17.—A 100-ton inquiry for a Newark, N. Y., subway project is the only new reinforcing bar job pending. Several road contracts are under consideration, however, to reach inquiry stage shortly, this will add 300 to 500 tons to the total tonnage pending. Inquiry is being covered slowly, continued snow having retarded building operations and steel buying as well.

Cleveland, Dec. 17.—A dearth of inquiry as well as buying is noted in concrete bars. Jobs taking 5 to 25 tons apiece are fairly numerous but larger work appears to be deferred. Another 100-ton lot probably will be bought for the National Town and Country clubhouse superstructure. That amount recently was placed for foundations. Quotations vary from 1.85c to 1.95c, Cleveland.

Chicago, Dec. 17.—Current awards of reinforcing bars are light but it is estimated that 3000 to 5000 tons is pending in territory tributary to Chicago. A part of this is active. Additional deformed bar tonnage has been placed with the mills for 1930 hard surface road programs. Both billet and rail steel reinforcing bar prices are irregular.

Awards Compared

	Tons
Awards this week	3,457
Awards last week	4,410
Awards two weeks ago	4,010
Awards this week in 1928	2,888
Average weekly awards, 1928	6,189
Average weekly awards, 1929	5,910
Average weekly awards, Nov	4,773
Total awards to date, 1928	319,715
Total awards to date, 1929	301,421

CONTRACTS PLACED

800 tons, convention hall, Philadelphia, to Concrete Steel Co.
750 tons, navy yard shipways, Philadelphia, to Truscon Steel Co.
380 tons, approaches and piling, Roosevelt road bridge, Chicago, to Kalman Steel Co.
365 tons, Veterans home, Yountville, Calif., to Concrete Engineering Co.
350 tons, bridge, Hackensack river, New Jersey, to Kalman Steel Co.
317 tons, paving in Imperial county, Sacramento, Calif., to unnamed interest.
155 tons, hotel, Ottawa, Ill., to Concrete Engineering Co.
125 tons, Bellevue hotel, Washington, to John J. Widmayer Inc.
115 tons, public school, No. 102, New York, to Tidewater Steel Co.
100 tons, office building, Montgomery street, San Francisco, to Gunn, Carle & Co.

CONTRACTS PENDING

1000 tons, (estimated) second unit United States Rubber Co., Passaic, N. J.
700 tons, two schools, Cincinnati board of education.
600 tons, Mundelein college building, Sheridan road and Devon avenue, Chicago; bids in.
600 to 700 tons (mesh) Brecksville road, Cleveland; bids in Dec. 18.
550 tons, cannery, Richmond, Calif.; bids received.
500 tons, United States postoffice, Baltimore, bids out.
450 tons, plant, Kohler Co., Long Island City, N. Y.
400 tons, subway section 3, route 110, New York.
380 tons, Roosevelt road bridge, Chicago; general contract to Underground Construction Co.
300 tons, hotel, San Jose, Calif.; bids being taken.
300 tons, Scioto Olentangy intercepting sewer addition, Columbus, O.; bids close Dec. 31.
206 tons, Rogue river bridge, Portland, Oreg.; bids opened.
150 tons, building, Princeton, N. J.
135 tons, Ninety-fifth street bridge, Chicago; general contract to Materials Service Corp.
104 tons, city of Los Angeles; bids Dec. 18.
100 tons, subway, Newark, N. Y.; bids Dec. 19.
100 tons, hotel, Fourteenth and Jackson streets, Oakland, Calif.; bids being taken.

Rails, Cars

Car Buying Continues—5700 Awarded, 2883 Asked—Rails Subside—60 Engines Bought

CAR interest is sustained with Missouri Pacific awarding 1285, Reading buying 2000, and Canadian National taking 2400 more. Louisville & Nashville will buy 1823 cars, coaches. St. Paul inquires for 1000 gondolas. Rail buying is transferred to Canada with 120,000 tons placed; domestic awards nominal. Three locomotive builders share orders for 60; inquiries number 39.

RAILROAD TRACK PRICES, PAGE 1582

Chicago, Dec. 17.—Several rail orders placed with Chicago district mills totaled 5000 to 6000 tons. Of this tonnage a portion was for a frog and switch maker and another portion for a plant subsidiary road. Some of this tonnage is to be shipped at once. Several smaller western roads may hold up 1930 tonnages until later. Peak track fastenings sales are close at hand, a buying movement being expected shortly with 14,000 tons for New York Central to be closed in a few days. About half of this is expected to go to western mills. Track fastenings sales last week totaled 3500 to 4000 tons, made up of moderate lots, mostly for current needs.

Union Pacific is ordered by the interstate commerce commission to build a 185-mile extension across Oregon. Construction is to start by July 1, 1930, by the Oregon-Washington Railroad & Navigation Co., which the Union Pacific controls through its ownership of the Oregon Short Line.

It is reported here that Illinois Central may purchase 4000 to 5000 cars shortly. No announcement is made whether Burlington will purchase its 1200 cars directly or build them in its own shops.

New York, Dec. 17.—Fresh car demand in this district continues quiet, although substantial new inquiry is expected soon. Notable, among prospective lists is that of the Chesapeake & Ohio railroad for 11,000. This railroad also is expected to buy 100 locomotives. A leading locomotive award involves 25 for the Wabash.

New York, New Haven & Hartford has doubled its spike requirements, now asking for 10,000 kegs. New York, Ontario & Western is asking prices on 1930 track accessory requirements, without stating definite tonnage.

Philadelphia, Dec. 17.—Baltimore & Ohio is inquiring for 15,000 kegs of track spikes. Norfolk Southern and Atlantic Coast Line both are inquiring for nuts, bolts and rivets for first quarter.

Pittsburgh, Dec. 17.—December tonnage of track fastenings is smaller than the November volume to date. Several roads, including the Baltimore & Ohio, Erie and Nickel Plate have yet to place their requirements of rails and fastenings and this business is expected within the next several weeks. With the railroads committed to a good volume of construction work during 1930, prospects are regarded as favorable. Activity in light rails and rerolled rails is limited.

Toronto, Ont., Dec. 17.—Canadian National has distributed orders for 4650 cars, 120,000 tons of rails and will take bids on 18 Santa Fe type locomotives and 15 mountain type engines.

Cleveland, Dec. 17.—Lima Locomotive Works, Lima, O., has received orders for 25 locomotives with tenders from the Missouri Pacific. The engines of the 2-8-4 type, weigh 411,500 pounds each while the tenders weigh 314,000 pounds apiece.

CAR ORDERS PLACED

Canadian National, 25 10,000-gallon tank cars, to Canadian Car & Foundry Co., in addition to 2250 50-ton box cars noted last week; 1175 50-ton box cars to National Steel Car Co.; and approximately 1000 box cars and 200 refrigerator cars to Eastern Car Co., making a total of 4650 cars.

Missouri Pacific, 1285 freight cars: 625 box and 35 caboose cars, to American Car and Foundry Co. and 625 box cars to Mt. Vernon Car Mfg. Co.

Northern Pacific, nine dining cars, to Pullman Car & Mfg. Corp.

Reading, 2000 steel box cars; 600 each to American Car & Foundry Co. and Bethlehem Steel Co., and 4000 each to Pressed Steel Car Co., and Standard Steel Car Co.

St. Louis-San Francisco, three dining cars, to Pullman Car & Mfg. Corp.

Wabash, three baggage and mail cars, to American Car & Foundry.

LOCOMOTIVE ORDERS PLACED

Beauharnois Power Co., 10 saddle tank construction locomotives with superheaters, to Canadian Locomotive Co., Kingston, Ont.

Missouri Pacific, 25 2-8-4 type locomotive, weighing 411,500 pounds each with tenders, each weighing 314,000 pounds, to Lima Locomotive Works.

Wabash, 25 locomotives, to Baldwin Locomotive Works.

RAIL ORDERS PLACED

Canadian National, 120,000 tons, 80,000 tons to Dominion Iron & Steel Co., and 40,000 tons to Algoma Steel Corp.

Central Railroad of New Jersey, 12,500 tons of 130-pound rails and 2115 tons of 100-pound rails, to the Bethlehem Steel Co.

CAR ORDERS PENDING

Chicago, Milwaukee, St. Paul & Pacific reported definitely in market for 2300 cars, including 1000 70-ton mill type gondolas.

Chicago, Rock Island & Pacific, 10 coaches.

Chicago, Burlington & Quincy, 10 gasoline-electric rail motor cars.

Jamaica Government railway, 40 20-ton box cars, bids asked by P. M. McKay, superintendent of rolling equipment, Kingston, Jamaica.

Louisville & Nashville, 1800 miscellaneous freight cars and 23 miscellaneous coaches, authorized for 1930 purchase; including 500 each drop-bottom gondolas and box cars, 300 hopper cars, 250 each low-side gondolas and flat cars; also 10 baggage cars, four combination coach and baggage cars, four coaches, three diners and two baggage and mail cars.

Southern Railway, 23 miscellaneous steel coaches.

LOCOMOTIVE ORDERS PENDING

Canadian National, 18 Santa Fe type locomotives and 15 mountain type engines.

Louisville & Nashville, six passenger locomotives, authorized for 1930 purchase.

On Executive Committee

Washington, Dec. 17.—The executive committee authorized by the national business survey conference, which was held on Dec. 5, was announced by Julius H. Barnes, chairman. Included in the list of twenty names besides the chairman are Owen D. Young, chairman of the board, General Electric Co. and Radio Corp. of America, New York; Myron C. Taylor, chairman, finance committee, United States Steel Corp., New York; and Clarence M. Woolley, chairman of the board, American Radiator & Standard Sanitary Corp., New York.

Pig Iron

(*Concluded from Page* 1583)

of eastern iron has just been docked at Milwaukee for delivery on orders recently booked. Occasional contracts are being booked for first quarter. Sales and shipments are slightly ahead of the comparable November rate. Spot and forward sales are booked at $20, base, Chicago.

Philadelphia, Dec. 17.—The pig iron market is quiet, though some tentative inquiries are in sight. Small and moderate size orders for foundry iron featured the past week. Prices continue $20.50 to $21, base, eastern Pennsylvania furnace. Sales include two tonnages of Alabama iron at $14.50, base, Birmingham.

St. Louis, Dec. 17.—Some tentative inquiries for pig iron for first quarter have been issued, several of which mention substantial tonnages. During the past several days approximately 4000 tons of iron was sold, all foundry and malleable grades, in lots of 50 to 250 tons. Shipments are up to expectations of producers, though the daily average in December has fallen below that of October and November. Prices are steady.

Birmingham, Ala., Dec. 17.—A few sales of pig iron have been made for delivery during first quarter, but larger melters have not come into the market. Inventories show less iron on consumers' yards than ever before. Two leading producers have advanced prices 50 cents to $14.50 to $15.00, base, Birmingham.

Toronto, Ont., Dec. 17.—Melters are turning their attention to pig iron requirements for the first quarter. During the week a number of contracts were closed for lots of 500 to 5000 tons. Improvement in spot demand also is a feature of the market. Prices are steady.

Strip

Production Increased to Offset Shutdown Over Holidays—Buying Continues Light

PRODUCTION of strip steel is being increased this week to make up for a complete shutdown next week, although buying is at a low ebb and contracting for first quarter is not being done actively. Backlogs have been well worked out and deliveries are not more than three weeks in any instance. Prompt shipment is possible in most sizes. Prices are held nominally unchanged.

STRIP PRICES, PAGE 1582

Pittsburgh, Dec. 17.—Strip steel buying shows no improvement but some producers are increasing operations this week to balance a complete shutdown next week. This has served to boost schedules of hot mills to 45 to 50 per cent although operations in cold-rolled strip generally are no higher than 30 per cent, with some at a lower rate. Releases from automotive consumers continue light and the outlook for a large tonnage in January is not bright. Mills rolling corrosion-resistant steel are active, with automotive makers showing interest in the use of this material on new models. First quarter contracting remains light, with prices quotably unchanged at 1.90c and 2.00c, Pittsburgh, for hot strip and 2.75c for cold strip.

New York, Dec. 17.—Hot-rolled strip steel is offered here at 1.90c to 2.00c, Pittsburgh, depending upon width, deliveries ranging two to three weeks. Little demand prevails. Cold-rolled strip steel is moderately steady at 2.75c, Pittsburgh, with deliveries in three weeks.

Philadelphia, Dec. 17.—Hot strip prices are somewhat easier and now range from 1.80c to 1.90c, and 1.90c to 2.00c, base, Pittsburgh, according to width. Cold-rolled strip is 2.75c, base, Pittsburgh, subjected to occasional differentials on attractive lots. Wide strip is competitive with blue annealed. The jobbing product continues $2 to $4 below blue annealed prices, depending on requirements.

Cleveland, Dec. 17.—Improvement in demand for hot and cold strip steel still lurks in the background. Customers indicate they expect to specify more freely in January. In the meantime, mills keep operating even at low schedules, with difficulty. Wide hot strip is quoted at 1.90c, Pittsburgh; narrow at 2.00c. Although some mills may have taken some prompt tonnage at slightly less, those are the quoted figures for first quarter. Cold is firm at 2.75c, Cleveland, and no interest is shown in contracting for next quarter.

Chicago, Dec. 17.—Hot strip mills are making some progress in booking tonnage for first quarter, although operations are below 60 per cent. Virtually no backlogs exist in cold-rolled strip. Cold-rolled producers are maintaining nominally the Pittsburgh-Cleveland base prices.

Rolled steel products produced in Poland in 1928 totaled 87,075 tons, while in nine months of 1929 they were 163,879 tons.

Cold Finished Steel

December Shipments at November Rate—Contracting Is Slow

COLD FINISHED PRICES, PAGE 1582

Pittsburgh, Dec. 17.—December shipments of cold-finished steel bars and shafting are holding to approximately the November rate but new buying is limited. Agricultural implement manufacturers, who are now in their busy season, are taking material in good volume. A number of contracts are being continued into first quarter and there is little activity in new contracting. The market continues 2.20c, Pittsburgh.

Cleveland, Dec. 17.—Cold bar finishers still encounter curtailed demands on the part of most customers. A few automotive specifications are coming through but demand is dull compared with August and September. The 2.20c, Cleveland price is firm with little done in first quarter contracting.

Recommend Liquidation

Boston, Dec. 17.—Directors of the Laconia Car Co. in their annual report to stockholders recommend the closing of the plant and liquidation of assets as promptly as possible. The company reported for the year ended September, 1929 a net loss of $213,749, compared with a net loss of $90,192 in the preceding fiscal year. The balance sheet as of Sept. 30 showed current assets of $378,771 and current liabilities of $26,736. Fixed and plant assets are carried at $514,852.

Wire

Better Sales Appear but Total Is Small—Prices Are Being Held Steady—Demand Is Light

WIRE producers at Chicago feel an enlivened demand for wire and its products and bookings are at a better rate, although not equaling the conditions in December, last year. At Pittsburgh the buying rate is below that of November. First quarter contracts are not being made generally. Operations are low and few contracts remain unfilled for fourth quarter delivery.

WIRE PRICES, PAGE 1582

Chicago, Dec. 17.—Wire mills in the Chicago district continue operations at about 50 per cent, but report an enlivened contract market. Sales closed for first quarter were greater than in recent weeks, although still behind December, 1928, when mills entered the new year with good order books. Prices are being maintained on the basis of 2.45c, Chicago or western mills, for wire, and $2.45 to $2.55 for wire nails. Little automotive tonnage has developed to bolster the market in this territory.

Worcester, Mass., Dec. 17.—Lagging behind production of December, 1928, demand for wire is light, as consumers desire to cut down on inventory closely by using whatever stocks are on hand. Plain bright wire to dealers is quoted at 2.55c to 2.65c, Worcester.

Pittsburgh, Dec. 17.—Business in wire products continues light with incoming orders below the November rate. Consumption of manufacturers' wire is slow and jobbers are restricting nail stocks. Interest in first quarter requirements remains light and contracting for that period is slow. This is partly due to the fact that current prices in some cases represent advances over fourth quarter contract levels. Producers continue to quote $2.40 to $2.50 for wire nails and 2.40c for plain wire. Operations are slower, with contracts practically completed.

Cleveland, Dec. 17.—Demand for wire and wire products lacks vigor. The price situation, however, is somewhat stronger than earlier in the quarter. Little or no first quarter activity is encountered. Jobbers' stocks, however, are low in direct contrast with conditions a year ago, and any improvement in demand will be immediately reflected by mill operations. Mills quote 2.40c, Cleveland, on plain wire and $2.40, Cleveland, on nails.

Philadelphia, Dec. 17.—Plain wire continues firm at 2.40c, base, Pittsburgh, but nails continue weak and the current range is $2.30 to $2.40, base, Pittsburgh. Wire demand is good but nails are slow.

Nonferrous Metals

Confidence Appears Stronger in General Market but Zinc Prices Drop Sharply—Copper Holds Unchanged—Tin Fluctuates

Prices of the Week, Cents a Pound

	Copper—Electro delivered	Copper—Lake delivered	Copper—Casting refinery	Straits Tin—New York Spot	Straits Tin—New York Futures	Lead—New York	Lead—East St. Louis	Zinc—St. Louis	98-99% Aluminum	Spot Antimony	Ingot Nickel
Dec. 11	18.00	18.10	17.12½	39.50	40.25	6.25	6.10	5.82½	23.90	8.45	35.00
Dec. 12	18.00	18.10	17.12½	39.62½	40.37½	6.25	6.10	5.80	23.90	8.42½	35.00
Dec. 13	18.00	18.10	17.12½	41.37½	42.00	6.25	6.10	5.77½	23.90	8.42½	35.00
Dec. 16	18.00	18.10	17.12½	41.75	42.62½	6.25	6.10	5.50	23.90	8.37½	35.00
Dec. 17	18.00	18.10	17.12½	41.37½	42.12½	6.25	6.10	5.50	23.90	8.37½	35.00

NEW YORK, Dec. 17.—Confidence is returning to the nonferrous metal market. Trade interests hold more faith that business will be of substantial size early in the new year. This trend also indicates more of a disposition to believe that copper will hold at 18.00c, Connecticut.

Sentiment in the general market has not yet been backed up by much buying except in lead. The latter has been active for early shipment. Copper exports have been active. Zinc is the one metal in which prices have dropped radically. Brass and copper mill products are quotably unchanged and new orders light. Mills are operating on short schedules.

Copper—Producers are holding the price in the face of light new business and adverse statistics because they are of the opinion that lower prices will not bring out substantial buying. A lower price probably would tend to drive customers away in the hope of still further cutting, it is said. Stocks of refined copper went up 38,000 tons last month to nearly 127,000 tons, the largest in several years. Output was cut slightly while shipments dropped by a wide margin to 105,000 tons, the smallest in several years. Curtailment is believed to have been much larger toward the end of the month than at the start. Unrefined stocks went up 2500 tons.

Zinc—Prime western price has gone down rapidly again with light buying. At times, certain producers have obtained orders for themselves by letting out some metal well below the price of the preceding day, but the buying as a whole has been small, with users waiting to see how much lower the market may go. The market has been in a demoralized state on some days with no prevailing price. Zinc ore price went down $2 to $36 a ton.

Tin—The market has been fluctuating in wide swings, mostly upward in the past week. Strength originated in London, where there apparently was more faith in curtailment talk than here where the market was mostly skeptical and little buying was done.

Lead—Buying is being done regularly and of moderate size nearly every day. The November statistics were much stronger than those of any other nonferrous metal.

Aluminum—Prices are unchanged and firm, but new buying is being held off for more definite indications on business at large.—*Daily Metal Trade.*

Woodmere Scrap Iron & Metal Co., Detroit, has bought and is wrecking the equipment of the Detroit, Jackson & Chicago Electric Railway Co. The road contains 76 miles of track.

Mill Products

Base price cents per pound f.o.b. mill, except where otherwise specified

SHEETS	
Yellow brass (high)	23.25
Copper, hot rolled	27.75
Lead, full sheets (cut ½c more)	10.00
Zinc sheet (100-pound base)	$10.50
Zinc strip (100-pound base)	$9.50
Aluminum, flat sheets, up to 10 gage, 3 to 72 inches wide	31.30
SEAMLESS TUBE	
Yellow brass (high)	2[illegible]25
Copper	.25
RODS	
Yellow brass (high, full turnings)	21.25
Naval brass	24.00
WIRE	
Copper	19.87½
Yellow brass (high)	23.75

Old Metals

Dealers' buying prices, cents per pound

HEAVY RED BRASS	
New York	11.00 to 11.50
Chicago	11.25 to 11.50
Cleveland	11.00 to 11.50
St. Louis	12.00 to 12.50
HEAVY YELLOW BRASS	
Cleveland	7.50 to 8.00
HEAVY COPPER AND WIRE	
New York	14.00 to 14.25
Boston	13.75 to 14.25
Chicago	12.50 to 12.75
Cleveland	13.50 to 14.00
St. Louis	11.50 to 12.00
RED BRASS BORINGS	
New York	10.25 to 10.75
YELLOW BRASS TUBING	
Cleveland	7.00 to 7.50
LIGHT COPPER	
New York	12.00 to 12.25
Chicago	11.50 to 11.75
Cleveland	12.00 to 12.50
St. Louis	11.50 to 12.00
LIGHT BRASS	
Boston	6.50 to 6.75
Chicago	6.00 to 6.50
Cleveland	5.50 to 6.00
St. Louis	7.00 to 7.50
ZINC	
New York	3.00 to 3.25
Cleveland	2.25 to 2.50
St. Louis	3.50
ALUMINUM	
Clippings, Cleveland	12.00 to 12.25
Borings, Cleveland	7.50 to 8.00
Cast, Cleveland	10.00 to 10.25
Cast, Boston	10.50 to 11.00
Cast, St. Louis	12.25 to 12.50

Secondary Metals

Remelt aluminum No. 12	16.25 to 16.50
Brass ingot, 85-5-5-5	15.50 to 15.75

Coke By-Products

1930 Buying Equals 1929—Phenol Situation Is Good

New York, Dec. 17.—Consumers of light oil distillates have covered in about the same volume as this year. Most buyers have contracted for next season's requirements at unchanged prices. Current business is largely confined to fill-in orders. Industrial buying is light, although toluol is slightly more active. Revival of output in the automobile industry is expected to bring more buying from that source.

Phenol continues in good seasonal demand, with supplies and buying well balanced. Midwest prices are reported 1 cent under New York and some such outside sales are reported under New York figures. The bulk of the business is around 17 cents. Contracting is fairly brisk.

Spot business in naphthalene is at a standstill. Stocks are increasing. Shipments against contracts are expected to start about Jan. 15. The dye industry has covered in fair volume.

Sulphate of ammonia is slow between seasons. Contracting has been completed.

Coke By-Products

Per Gallon at Producers' Plant in Tank Lots

	Spot
Pure benzol	$0.23
90 per cent benzol	0.23
Toluol	0.40
Solvent naphtha	0.30
Commercial xylol	0.30
Per Pound at Producers' Plants in 250-Pound Drums	
Phenol	0.17 to 0.18
Per Pound at Producers' Plants	
Naphthalene flakes	0.04½ to 0.05½
Naphthalene balls	0.05½ to 0.06½
Per 100 Pounds Delivered	
Sulphate of ammonia	$2.10 to $2.20

Quicksilver Steady

New York, Dec. 17.—Quicksilver is steady though quiet at $124 to $124.50 a flask.

Warehouse

Year's Close Brings Slower Sales—New York Notes Heavy Sheet Movement—Nails Down at Pittsburgh, Sheets in California

AS USUAL at the year end, sales by warehouses generally are declining. Structural shapes as well as sheets, are active in New York, however. Detroit jobbers supplying large automobile producers' parts makers are shipping heavily. Chicago warehouses note a start on spring buying of railroad material. Nails are down at Pittsburgh and sheets decline $2 at San Francisco.

New York—In spite of adverse seasonal influences, jobbers report an increase in business. Demand is particularly good for structurals and black and galvanized sheets. Prices are not steady on black sheets, but galvanized sheets are firm at 4.50c.

Pittsburgh—Business continues quiet. December to date has been only moderately below seasonal average. Orders are for smaller lots, with buying diversified. Concessions are developing in some products although prices are quotably unchanged except in nails which at $2.60 are off 15 cents a keg for both the common and cement coated.

Buffalo—Approaching holiday suspensions send business below seasonal averages. The quarter, however, is about par with the same period, 1928.

Detroit—Jobbers supplying industrial companies and parts makers working on orders from Ford Motor Co. note an improvement. Other warehouse customers who bought heavily in October-November are now taking small quantities.

Chicago—Buying of finished steel from warehouses is in satisfactory seasonal volume. December orders show a falling off from last year. Spring demand is not yet shaping up definitely except for some of the railroad material. Prices show no change.

Cincinnati—December warehouse business continues at the reduced scale encountered last month. Tonnage for the entire year will undoubtedly compare favorably with 1928. Quotations are unchanged.

St. Louis—Business holds at about the average of the past several weeks, but less active than at this time last year. An improvement is noted in the call for a variety of goods from the south, and purchasing by the bituminous coal mines has picked up. The price trend is slightly easier, but quotations are unchanged.

San Francisco—Sheets have declined $2 per ton, black going to 4.90c, galvanized to 5.30c and blue annealed to 3.90c. Demand is fairly well sustained.

Warehouse Quotations in Cents Per Pound at Leading Market Centers

STEEL BARS

Baltimore	3.25c
Boston	3.265c
Buffalo	3.30c
Chattanooga	3.25c
Chicago	3.00c
Cincinnati	3.30c
Cleveland	3.00c
Detroit	3.00c
Ft. Worth	3.75c
Houston	3.00c
Los Angeles	3.30c
New York†††‡	3.25c
Philadelphia*	2.80c
Pittsburgh	2.90c
Portland	3.00c
San Francisco	3.40c
Seattle	3.15c
St. Louis	3.15c
St. Paul	3.25c
Tulsa	3.75c to 4.04c

IRON BARS

Baltimore	3.25c
Boston	3.265c
Buffalo	3.30c
Chattanooga	3.25c
Chicago	3.00c
Cincinnati	3.30c
Detroit	3.00c
Ft. Worth	3.75c
New York††	2.80c to 3.24c
Philadelphia*	2.80c
St. Louis	3.15c
Tulsa	3.75c to 4.04c

REINFORCING BARS

Baltimore	3.31c
Boston	3.265c to 3.50c
Buffalo	2.95c
Chattanooga	3.25c
Cincinnati	3.15c
Cleveland	2.25c to 2.44c
Detroit	2.30c to 3.00c
Ft. Worth	3.50c
Houston	3.00c
Los Angeles cl	2.40c
Los Angeles lcl	2.70c
New York	2.90c to 3.30c
Philadelphia	2.77c to 2.92c
Pittsburgh	2.90c to 3.175c
San Francisco cl.	2.30c
San Francisco lcl.	2.60c
Seattle	3.00c
St. Louis	3.15c
Tulsa	3.75c to 4.00c
Youngstown	2.30c to 2.60c

STRUCTURAL SHAPES

Baltimore	3.25c
Boston	3.365c
Buffalo	3.40c
Chattanooga	3.35c
Chicago	3.10c
Cincinnati	3.40c
Cleveland	3.00c
Detroit	3.10c
Ft. Worth	4.00c
Houston	3.25c
Los Angeles	3.30c
New York†††‡	3.15c to 3.30c
Philadelphia*	2.70c
Pittsburgh	3.00c
Portland	3.00c
San Francisco	3.40c
Seattle	3.15c
St. Louis	3.25c
St. Paul	3.35c
Tulsa	3.75c to 4.14c

PLATES

Baltimore	3.25c
Boston	3.365c
Buffalo	3.40c
Chattanooga	3.35c
Chicago	3.10c
Cincinnati	3.40c
Cleveland, ¼-in. and thicker	3.00c
Cleve., 3/16-in.	3.20c
Detroit	3.10c
Detroit, 3/16-in.	3.10c
Ft. Worth	4.00c
Houston	3.00c
Los Angeles	3.30c
New York‡‡	3.30c
Philadelphia*	2.70c
Pittsburgh	3.00c
Portland	3.00c
San Francisco	3.40c
Seattle	3.15c
St. Louis	3.25c
St. Paul	3.35c
Tulsa	2.75c to 4.14c

NO. 10 BLUE ANNEALED

Baltimore	3.60c
Boston 3/16-in.	3.915c
Buffalo	3.50c
Chattanooga	3.75c
Chicago	3.35c
Cincinnati	3.45c
Cleveland	3.25c
Detroit	3.35c
Ft. Worth	4.50c
Houston	3.90c
Los Angeles	4.00c
New York‡‡	3.50c to 3.90c
Portland	3.75c
Philadelphia*†	3.25c
Pittsburgh**	3.35c to 3.45c
San Francisco	3.90c
Seattle	4.00c
St. Louis	3.45c
St. Paul	3.75c
Tulsa	4.20c to 4.34c

NO. 24 BLACK SHEETS

Baltimore*†	3.75c
Boston	4.85c
Buffalo	4.20c
Chicago	4.05c
Cincinnati	4.05c
Cleveland***	3.75c to 3.90c
Detroit	3.95c
Ft. Worth	4.70c
Los Angeles	4.90c
New York	3.90c
Philadelphia*†	3.90c
Pittsburgh**	3.85c
Portland	4.90c
San Francisco	4.90c
Seattle	5.00c
St. Louis	4.25c
St. Paul	3.89c
Tulsa	4.34c

NO. 24 GALVANIZED SHEETS

Baltimore*†	4.50c
Boston	5.60c
Buffalo	4.70c to 4.85c
Chicago	4.90c
Cincinnati	4.90c
Cleveland***	4.60c to 4.75c
Detroit	4.75c
Ft. Worth	5.50c
Houston	5.40c
Los Angeles	5.30c
New York	4.50c
Philadelphia*†	4.65c
Pittsburgh**	4.85c to 4.95c
Portland	5.50c
San Francisco	5.30c
Seattle	5.50c
St. Louis	5.10c
St. Paul	4.68c
Tulsa	5.10c to 5.35c

BANDS

Baltimore	4.00c
Boston	4.015c to 5.00c
Buffalo	3.65c
Chattanooga	3.45c
Chicago	3.20c
Cincinnati	3.50c
Cleveland	3.25c to 3.65c
Detroit 3/16-in. and lighter	3.30c
Ft. Worth	4.25c
Houston	3.65c
Los Angeles	4.15c
New York‡‡	3.75c
Philadelphia*	3.30c
Pittsburgh	3.25c
Portland	4.00c
San Francisco	3.75c
Seattle	4.00c
St. Paul	3.50c
Tulsa	4.50c to 4.69c

HOOPS

Baltimore	4.00c
Boston	5.50c to 6.00c
Buffalo	4.05c
Chicago	3.75c
Cincinnati	4.05c
Cleveland	3.25c to 3.65c
Detroit, No. 14 and lighter	3.80c
New York‡‡	4.25c
Philadelphia*	3.55c
Pittsburgh	4.25c
Seattle	5.00c
St. Paul	4.00c

COLD FINISHED STEEL

	Rounds, Falts, hexagons, squares	
Baltimore (c)	3.50c(a)	4.00c
Boston	3.55c	4.05c
Buffalo	3.95c	4.45c
Chattanooga*	3.85c	4.35c(d)
Chicago	3.60c	4.10c
Cincinnati	3.85c	4.35c
Cleveland	3.65c	4.15c
Detroit	3.85c	4.35c
Los Angeles (a)	4.50c	.....
New York	3.50c	4.00c
Philadelphia*	3.50c	4.00c
Pittsburgh	3.70c	4.20c
Portland (a)	4.50c	.....
San Fran. (a)	4.25c	.....
Seattle (a)	5.00c	.....
St. Paul (a)	3.85c	.....
Tulsa	4.64c	5.14c

(a) Rounds only; (d) Squares only.

COLD ROLLED STRIP

Boston, 0.100-inch, 500 pounds lots	5.30c
Buffalo	5.85c
Chicago (b)	6.10c
Cincinnati	7.15c
Cleveland (b)	5.95c
Detroit	5.80c
New York	5.15c
Philadelphia (c)	5.15c

(b) Net base, straightening, cutting, boxing 1 ton or more. (c) Plus mill, size and quantity extras.

SWEDISH IRON AND STEEL

New York duty paid

Hollow drill steel	13.00c
Iron bars, round	6.10c
Iron bars, flats and squares	6.50c

*Plus quantity differentials. ‡‡Minus quantity differentials. ††Domestic bars. **Less than 25 sheets. *†50 or more bundles. ***Less 0.15c where more than 10 bundles are ordered at once for delivery at one time

Pacific Coast

Holiday Dullness Marks Coast Buying—Much Pending Tonnage Promised

VARIOUS end-of-the-year influences are keeping iron and steel buying at a low point on the Pacific coast. However, numerous projects in various stages are being developed and tonnage involved will be large. Current buying for the most part is in small lots and the aggregate is not imposing. Prices are holding well and plates seem the only weak item.

San Francisco, Dec. 14.—(*By Air Mail*)—Trading in Pacific coast markets has tapered somewhat and little real business is now expected until after the first of the year. Important awards included 900 tons of structural shapes for an office building in San Francisco, 365 tons of reinforcing bars for a Veteran's Home in Yountville, Calif., and 293 tons of cast iron pipe for San Diego, Calif. With few exceptions, inquiries were confined to lots of less than 100 tons. Prices are fairly firm, plates being the weakest item.

Pig Iron and Coke

New jobbing work is lacking and as a result the majority of foundries are operating on limited schedules. Sales and inquiries continue to involve small tonnages only. Quotations remain unchanged from those listed last week.

Coast Pig Iron Prices

Utah basic	$25.00 to 26.00
Utah foundry	25.00 to 26.00
*German	24.25
*Indian	25.00 to 26.00

*C.i.f. duty paid.

Bars, Plates and Shapes

The Concrete Engineering Co. took 365 tons of concrete tons for the Veterans Home at Yountville and Gunn, Carle & Co. secured 100 tons for an office building on Montgomery street, San Francisco. An unnamed interest was awarded 317 tons for highway work in Imperial County, Calif. New inquiries, on which bids are being taken or have been opened, include 550 tons for a cannery in Richmond, Calif., 300 tons for a hotel in San Jose and 206 tons for the Rogue River Bridge, Portland, Oreg. In the San Francisco district, out-of-stock prices continue unchanged at 2.30c, base, on carload lots, with 2.60c on smaller tonnages.

The United States Engineer office, Sacramento, Calif., has opened bids on shore pipe involving 196 tons of ⅜-inch plate. Prices continue weak and the 2.35c, c.i.f. price has recently been shaded by $4 a ton.

Several fair sized structural awards were placed during the week and included 900 tons and 830 tons, respectively, for office buildings in San Francisco and Phoenix, both with McClintic-Marshall Co. The Herrick Iron Works took 160 tons for a plant for the Pacific Electric Mfg. Co., in San Francisco. No new inquiries of importance developed during the week. Plain domestic material continues firm at 2.35c, c.i.f. coast ports.

Other Finished Material

After a spurt last week, demand for cast iron pipe has again fallen off and awards this week involved only four projects, three of which called for lots of less than 100 tons. The Miracle Construction Co. took 293 tons for the improvement of La Mesa Colony, San Diego. Awards so far this year aggregate 81,657 tons, compared with 75,655 tons for the same period a year ago. The United States Pipe & Foundry Co. was low bidder on 139 tons for Modesto, Calif.

Seattle Market Is Quiet

Seattle, Dec. 12.—Conditions in the iron and steel market of the Pacific northwest are quiet, due to inventories and the holiday season. However, several important projects are to be up for figures within 30 days. In addition to the $650,000 James Monroe junior high school and the University of Washington biology building, work is to start early in January on the addition to the Medical and Dental building and the 22-story Washington Athletic club, Seattle. Plans have been completed for the King County hospital, to cost $2,000,000, and bids will be received Jan. 6 or 13. Bids will be opened Jan. 21 at Washington, D. C., for the government immigration station and assay office building at Seattle.

Two important ship repair jobs have been closed by Todd Dry Docks Inc., Seattle, involving considerable steel work. Public works awards in the Northwest are at a low ebb this month.

Bars, Plates and Shapes

No new projects involving important tonnages of plates or shapes have developed. Several small jobs are pending. The largest structural award on which local plants are figuring involves 1200 tons for the Washington Athletic building, which will likely be placed this month.

Western Machinery Exchange, Aberdeen, Wash., has received from the Chrome Steel Works, New Jersey, a 35-ton electric crane for use in the former firm's new machine shops. The British Columbia Electric Co. has placed a contract with the English Electric Co. of Canada Ltd., Toronto, for a $10,000 water-wheel for installation in the company's hydroelectric project at Jordan River, B. C. A second contract was awarded to the same firm for a $90,000 generator. For the same project the Canadian Westinghouse Co. Ltd. will furnish a number of transformers on a reported bid of $55,000.

Pipe Inquiry Is Slack

Municipal engineers in Northwest cities are preparing their estimates of 1930 requirements and some new business will develop as soon as budgets are available. In the meantime inquiry is slack. Vancouver, B. C., is advertising for 20,000 feet of 6-inch Class C cast iron pipe, bids Jan. 6. Salem, Oreg., will receive bids Dec. 19 for furnishing 6000 feet of 6 and 8-inch cast iron pipe and also 2000 feet of 4-inch steel pipe. Seattle has purchased 4000 feet of galvanized wrought pipe from the Pacific Waterworks Supply Co.

Auto Production Slumps in November

Washington, Dec. 17.—November automobile production was the lowest since December, 1927, according to the department of commerce. There were 217,441 units produced in the United States, compared with 257,140 in November, 1928. Total production for 11 months, however, shows a gain over the same period last year of more than 1,111,000 units. The Canadian figures are not available. Monthly comparisons follow:

	United States			Canada
	Total	Passenger cars	Trucks	Total
1928				
November	257,140	216,754	39,686	11,769
Total (11 mos.)	4,124,643	3,616,179	502,787	232,957
December	234,116	204,957	28,123	9,425
Total (year)	4,358,759	3,821,136	530,910	242,382
1929				
January	401,037	347,382	51,591	21,501
February	466,353	405,708	58,537	31,287
March	585,223	513,344	69,800	40,621
April	621,347	537,225	82,436	41,901
May	604,084	516,055	86,711	31,559
June	545,356	452,598	91,380	21,492
July	500,392	426,137	73,201	17,461
August	498,375	441,942	55,393	14,214
September	415,697	364,786	50,046	13,817
October	*380,011	320,327	58,816	14,523
November	217,441	169,309	46,513	(2)
Total (11 mos.)	5,235,316	4,494,813	724,424	.....

*Revised.
(2) Not available.

Will Retain Barton Plant

Scott-Weiss Steel Co., Chicago, dealer and broker in iron and steel products, plans and equipment, states that it will retain the plant, leasehold and equipment of the Barton Steel Co., 3426 South Kedzie avenue, Chicago, which the Scott-Weiss company bid in at receivership sale on Dec. 3.

The Scott-Weiss company will occupy a part of the premises for office and warehouse purposes and will lease other portions of the property. The company states that the Barton Steel Co. property was not bid in for the Joslyn Mfg. & Supply Co., Chicago.

Republic Heads Midwest Merger

With Central Alloy, Donner, Bourne-Fuller and Trumbull Cliffs Forms Third Largest Steel Unit—Girdler Chairman, McCleary President

CLEVELAND, Dec. 17.—Merger of the Republic Iron & Steel Co., Central Alloy Steel Corp., Donner Steel Co. and Bourne-Fuller Co., forming the third largest iron and steel enterprise of the country, was effected here today.

The name of the merged companies probably will be the Republic Steel Co. Its total assets will be approximately $350,000,000, its annual net sales about $250,000,000, and its annual steel ingot capacity about 4,900,000 tons.

T. M. Girdler, until a few months ago president of the Jones & Laughlin Steel Corp., is to be chairman of the board of the merged companies. E. T. McCleary, president of the Republic company, will be president. F. J. Griffiths, chairman of the Central Alloy corporation, is to be president of the Republic Research Co., which will be formed to take charge of all research and metallurgical work.

The principal executives of the merged company, in addition to the forenamed, will be B. F. Fairless and J. N. Schlendorf, of the Central Alloy corporation; H. T. Gilbert and W. M. Neckerman, of the Republic company; W. P. Witherow, of the Donner company, and R. S. Hall, of the Bourne-Fuller Co. The active staff also will include R. J. Wysor, formerly general manager of the Jones & Laughlin corporation and recently associated with Continental Shares Inc., leading Otis-Eaton-Mather investment trust.

The merger, approved by the boards of the various companies and to be submitted at an early date to stockholders, brings together a number of iron and steel interests in which the Otis-Eaton-Mather group are heavily interested. Reports of a Middle West steel consolidation have usually incorporated the Youngstown Sheet & Tube Co. and the Inland Steel Co., neither figuring in today's merger.

In addition to the principal companies above enumerated, the Republic company now includes the Union Drawn Steel Co. and Steel & Tubes Inc. The Central Alloy corporation embraces the Berger Mfg. Co. and the Interstate Iron & Steel Co. The Donner company recently took over the Witherow Steel Corp.

The Trumbull Cliffs Furnace Co. also is involved. Instrumental in the consolidation were the Cliffs Corp., controlling the Cleveland Cliffs Iron Co., and Continental Shares Inc., one of the largest investment trusts in the country. These interests are understood to be among the largest holders of steel stocks in the world. Co-operating in the undertaking were the steel and ore interests of Pickands, Mather & Co., the M. A. Hanna Co. and Otis & Co.

Physical properties of the merged companies, as officially announced, include 14 blast furnaces, 67 open-hearth steel furnaces, 7 electric furnaces, 2 bessemer converters, 633 coke ovens 16 rolling mills (9 blooming and 7 billet and sheet bar mills) and 160 finishing mills. The latter include 22 bar mills, 2 plate and skelp mills, 5 strip mills, 85 sheet mills, 4 rod mills, 8 tube mills and 34 tin plate mills.

Raw material resources are said to approximate 125,000,000 tons of iron ore, 165,000,000 tons of coal and 30,000,000 tons of limestone and dolomite. In addition, the new company has available, through close association of interests, the extensive iron ore reserves of the Cleveland Cliffs Iron Co.

Except for rails and structural shapes, of the major steel products, the new Republic Steel Co. will be completely integrated from iron ore to finished material. It has plants, in addition to the Mahoning Valley and Cleveland, at Birmingham, Buffalo, Detroit, Pittsburgh and Chicago. Through the Central Alloy corporation, it is in a strong position in regard to alloy steels and the new heat and corrosion resistant alloys.

The Republic company and Steel & Tubes are important factors in the newly-developed art of welding pipe and tubing electrically. The Witherow corporation owns noteworthy patents on forging processes. The Johnson patents for the manufacture of pipe, the Witherow patents for die rolling and the Toncan patents are listed as valuable assets.

A comparison of the ranking iron and steel producers follows:

United States Steel Corp., (including Pacific coast properties to be acquired shortly) 21,054,145 gross tons of pig iron and 24,541,000 tons of steel ingots.

Bethlehem Steel Corp. (including new Pacific coast properties) 6,960,000 tons of pig iron and 8,190,000 tons of steel ingots.

Republic Steel Co., 2,900,000 tons of pig iron and 4,900,000 tons of steel ingots. Also 3,350,000 tons of semifinished and 5,400,000 tons of finished steel.

Jones & Laughlin Steel Corp.: 2,800,000 tons of pig iron and 3,270,000 tons of steel ingots.

Youngstown Sheet & Tube Co.: 3,170,000 tons of pig iron and 2,717,000 tons of steel ingots.

Inland Steel Co.: 950,000 tons of pig iron and 1,800,000 tons of steel ingots.

American Rolling Mill Co.: 831,400 tons of pig iron and 1,557,500 tons of steel ingots.

Continental Shares Inc., organized in 1926 with a paid-in capital of $6,500,000, now has total assets of over $130,000,000. It has broad powers to acquire, hold and deal in securities of all kinds, to participate in syndicates and underwritings ,and to engage in other financial transactions. Its chief purpose is to acquire substan-

Merger Steps as Related in Iron Trade Review

July 22, 1926—*United Alloy Steel Corp., Canton, O., and Central Steel Co., Masillon, O., consolidated, Cyrus S. Eaton and associates acquiring heavy interest in Central Alloy Steel Corp.*

April 14 1927—*Cyrus S. Eaton and associates acquire large interest in Republic Iron & Steel Co.*

April 18, 1929—*Eaton and associates negotiate for* 51,000 *shares of the Bourne-Fuller Co., Cleveland.*

Sept. 12, 1929—*Eaton and associates buy controlling interest in Donner Steel Co.*

Oct. 8, 1929—*Central Alloy Steel Corp. purchases Interstate Iron & Steel Co.*

Oct. 31, 1929—*Republic Iron & Steel Co. acquire Union Drawn Steel Co.*

Nov. 19, 1929—*Donner Steel Co. and Witherow Steel Corp. merged.*

Dec. 12, 1929—*Donner-Witherow and Central Alloy-Interstate mergers completed.*

Dec. 17, 1929—*Republic Iron & Steel Co., Central Alloy Steel Corp., Donner Steel Co. and Bourne-Fuller Co. merged.*

tial holdings, either alone or in conjunction with affiliated interests, in such basic industries as steel, rubber and public utilities. At present steel holdings are estimated to be about one-third of its total holdings.

Republic Iron & Steel Co. ore reserves as of 1927 were listed as 110,215,661 tons, of which 75,478,029 tons was in southern states, chiefly Alabama, and 34,737,632 tons in the Lake Superior district. However, it has increased its reserves, especially in the Lake Superior district, in recent years. This year it acquired the lease to the Pettit mine, underground, Mesabi range, which it had surrendered about three years ago, and also obtained a lease on the Philbin, underground, Mesabi.

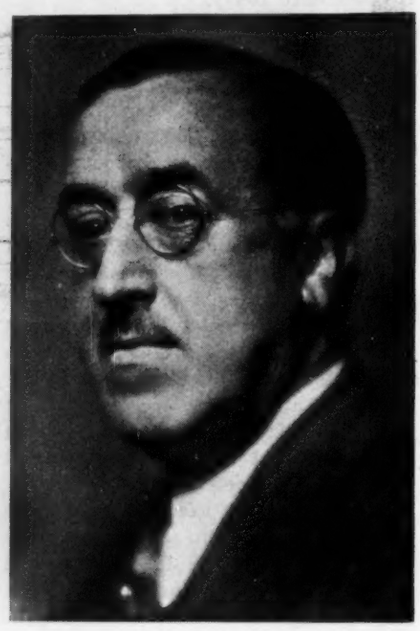
The Republic company also has an interest in the Mahoning Ore & Steel Co., operated by Pickands, Mather & Co., and the Mesaba-Cliffs Iron Mining Co., operated by Cleveland-Cliffs Iron Co., Susquehanna Ore Co., owned jointly by Republic, Inland Steel Co. and National Steel Corp., and operated by the M. A. Hanna Co., and the Vermillion Mining Co., operated by the firm of Pickands, Mather & Co.

Republic also owns and operates the Kinney mine, open pit, Minnesota, and the Cambria, underground, Michigan. It also operates the Townsite mine, Michigan, under the name of the Townsite Mining Co., and the Union mine, Minnesota, under the name of the Union Ore Co.

The Donner Steel Co.'s interest in iron ore property is mainly in the Donner Mining Co., which operates the Alexandria mine, in Minnesota, which the state lists as having reserves estimated at 2,488,288 tons.

T. M. Girdler

Elmer T. McCleary



Frederick J. Griffiths

T. M. GIRDLER has been an executive of Continental Shares Inc., Cleveland, since resigning in October as president of the Jones & Laughlin Steel Corp. After graduating from Lehigh in 1901 as a mechanical engineer, he was with Buffalo Forge Co. He sold heating and ventilating equipment in England and then became affiliated with Oliver Iron & Steel Co., Pittsburgh, and Colorado Fuel & Iron Co., Pueblo, Colo., and in 1907 became rolling mill superintendent, Atlantic Steel Co., Atlanta, Ga. Seven years later he was appointed assistant general superintendent, Aliquippa works, Woodlawn, Pa., Jones & Laughlin Steel Co., and in 1920 became general superintendent. He again was promoted in 1924 to be general manager in charge of all Jones & Laughlin operations. In 1926 he was elected vice president and director in charge of operations and in May, 1927, was made a member of the executive committee. Early in 1928 he was made president.

ELMER T. McCLEARY has been president of Republic Iron & Steel Co., Youngstown, O., since April, 1928. He was born at Pine Grove Furnace, Cumberland county, Pa., and was graduated from Penn State college in 1901 as a metallurgist. He worked for the Diamond State Steel Co., Wilmington, Del., and Ohio works, Carnegie Steel Co., Youngstown, O. When Youngstown Sheet & Tube Co. started its blast furnaces and steel plant in 1906, he was made chief chemist. By successive promotions he became assistant superintendent of blast furnaces and steel plant, steel superintendent, assistant general superintendent and in 1923, after acquisition of Brier Hill Steel Co. and Steel & Tube Co. of America, he was made Youngstown district manager. A year later he was appointed assistant vice president and in January, 1926, vice president in charge of operations. In April, 1928, he was elected president to succeed Thomas J. Bray, resigned.

FREDERICK J. GRIFFITHS has been chairman of the board of the Central Alloy Steel Corp., Massillon, O., since it was formed in 1926 by the consolidation of the Central Steel Co. and the United Alloy Steel Corp. He was born in Witton, England, Dec. 11, 1877, located in Cleveland at 14 and two years later started to work in the chemical laboratory of the Cleveland Rolling Mill Co., Newburgh, which in 1898 became part of the American Steel & Wire Co. In 1901 he began work in the laboratory of the Portsmouth Steel Co., Portsmouth, O., and later was employed at its open hearths. In 1904 he was employed by the United Steel Co., the forerunner of the United Alloy Steel Corp. After becoming open-hearth superintendent he left in 1914 as assistant general superintendent to become vice president and general superintendent for the Central Steel Co. Made president in 1921 he so continued until made chairman in 1926.

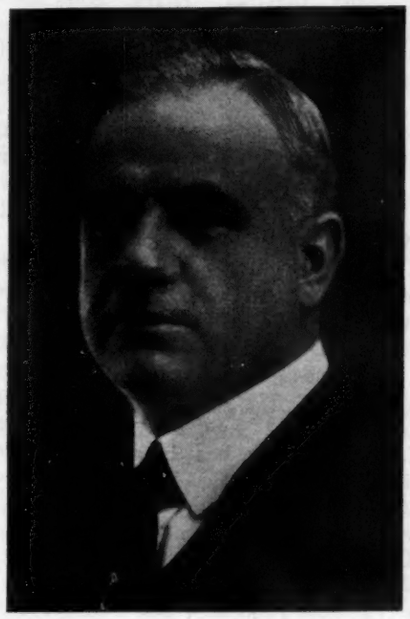
Industrial Men in the Day's News

Louis C. Reis, President and General Manager, Minnesota Steel Co., Duluth.

WITH more than 30 years experience in iron and steel, he belongs to that industry's group of veterans although he is only 48 years old.

SIXTEEN years with subsidiary companies of the United States Steel Corp., he now heads a company with which he became identified May 20, 1913.

BORN in New Castle, Pa., he was employed there in two different plants until he located in Duluth in 1913.



LONG a veteran in the steel industry, although only 48 years of age, Louis C. Reis brings to his new position as president and general manager of the Minnesota Steel Co., Duluth, a wealth of experience in practical steel making and plant operation gained in his more than 30 years connection with those lines. For 16 of the 30 years he has been affiliated with subsidiary companies of the United States Steel Corp., he has been identified with the company he now heads. He began May 20, 1913 as assistant master mechanic and served in that position during the company's plant construction period.

Mr. Reis not only is a steelmaker in his own right, but comes from a family of steelmakers, at least two other members having been prominent in that industry. While his father, Charles H. Reis, has never been connected with the industry, his father's cousins, John Reis and George L. Reis, both were at one time high executives of the Minnesota Steel Co. John Reis was president of that company and also vice president of the United States Steel Corp. George L. Reis was formerly vice president and general manager of the Minnesota Steel Co. Both have since retired, John now residing in Montclair, N. J., and George L. in Knoxville, Tenn.

Born Jan. 20, 1881, at New Castle, Pa., where he attended grade and high schools. Mr. Reis served his apprenticeship in the shops of the Pennsylvania Engineering Works there. In 1899, he entered the employ of the Carnegie Steel Co., New Castle works, as a machinist, advancing to foreman in the machine shop. From there he went to the Minnesota Steel Co. in 1913.

Feb. 1, 1916, shortly after the plant at Morgan Park was put in operation, he was made general master mechanic of the Minnesota Steel Co. and on May 1, 1920, general superintendent. Sept. 26, 1927, he was elected vice president of the company, and continued in his capacity of general superintendent.

In his recent appointment as president and general manager of the Minnesota Steel Co. and also of the Morgan Park Co., he succeeds the late Samuel B. Sheldon. Mr. Reis is a member of the American Iron and Steel institute, as well as other organizations and is a director of the Park State bank, Morgan Park, Duluth.

ERWIN E. DRESSE, chief engineer for the past year of the Lincoln Electric Co., Cleveland, has been appointed professor of electrical engineering, Ohio State university, Columbus, O., effective Jan. 1. Mr. Dresse is a graduate of the University of Michigan. He was made instructor in electrical engineering, winning a master of science degree during the four years. Last June he was granted a professional doctor's degree of electrical engineer, a distinction conferred only once previously by the school. He is a member of the American Institute of Electrical Engineers.

* * *

William C. Whitney, of Winchendon, Mass., has been made a director of the Yates-American Machine Co. Mr.

Whitney is president of Baxter D. Whitney & Son Inc., Winchendon, manufacturer of wood-working machinery. The Yates company is exclusive sales agent of the Whitney line.

* * *

W. H. Van Vleck has resigned as New York district sales manager of the Alan Wood Steel Co., Conshohocken, Pa.

* * *

Louis Berg, formerly manager of manufacturing for the AC Spark Plug Co., Flint, Mich., and with the company for 12 years, has been named works manager.

* * *

L. A. Fields, in charge of sales, Solon Grinding Co., Seattle, in eastern Washington, has been transferred to the Seattle plant as assistant manager, to succeed M. H. Bertenshaw.

* * *

J. E. Fletcher, affiliated with the Northern Engineering Works, Detroit, for many years, has been appointed manager of its Philadelphia office, recently established.

* * *

George H. Freers, who has been assistant chief engineer of the Marmon Motor Car Co., Indianapolis, has been made chief engineer, to succeed Thomas J. Litle Jr., resigned.

* * *

Walker M. Leavett, Clinton, Conn., has been appointed general manager of the Welker-Hoops Co., Middletown, Conn., manufacturer of automobile accessories.

* * *

S. A. Mitchell, secretary and general manager of the Irwin Auger Bit Co., Wilmington, Del., resigned recently after being affiliated with the company since 1913.

* * *

Harry R. Nelson, formerly with Charles L. Anderson Machinery Co., Chicago, now is connected with Tool Equipment Sales Co., Chicago, as mechanical engineer.

* * *

Griffith Robinson, Pittsburgh, has resigned as president of the Tarentum Steel Corp., Tarentum, Pa., which is to manufacture wide light gage, full finished sheets.

* * *

T. P. Barry Jr., formerly identified with the Sheffield Steel Corp., Dallas, Tex., now is southwestern representative for the Tulsa Rolling Mills, 401 Construction Industries building, Dallas.

* * *

Philip Brown, identified with the Wilkoff Co., Youngstown, O., scrap iron and steel, for about 15 years, has been elected vice president and general manager of the mill and warehouse division.

* * *

H. M. Davison, who has been eastern territory manager of excavator sales for the Harnischfeger Sales Corp., has been made general sales manager of the company, with offices at Milwaukee.

* * *

Arthur Hughes, president of the Hughes-Keenan Co., Mansfield, O., has been made president of the recently reorganized Superior Body Corp. This does not involve a merger of the two companies.

* * *

John E. Galvin, president, Ohio Steel Foundry Co., Lima, O., is a member of a nonpartisan committee of 100 members, appointed recently by Governor Myers Cooper to draft a new system of tax laws for the state of Ohio.

* * *

H. G. Mouat, 1116 Martin building, Birmingham, Ala., has been appointed southern district representative of the Clark Controller Co., 1146 East 152nd street, Cleveland, manufacturer of electrical and mechanical apparatus.

* * *

Edwin H. Steedman, who recently retired from the presidency of the Curtis Mfg. Co., St. Louis, has been elected chairman of the board of directors. Tom K. Smith was elected a director and Walter C. Hecker, president.

* * *

Rodney W. Chamberlain has been appointed sales manager of the Stanley Electric Tool Co., New Britain, Conn., a subsidiary of the Stanley Works. Frank E. Marvin and Sheridan McClellan of the sales department, Stanley Works, were promoted district managers.

* * *

William L. Goodwin, president, Goodwin, Morton & Badrian Inc. merchandising counsellors, and formerly operating vice president of the Society for Electrical Development, was elected president of the Armstrong Electric & Mfg. Co., Huntington, W. Va.

* * *

R. B. Tuhey has been advanced to district representative at Indianapolis, with headquarters at 517 Peoples Bank building, for the Lincoln Electric Co., Cleveland.

S. H. Taylor has been promoted to district representative for the company at Los Angeles, with headquarters at 812 Mateo street.

* * *

F. A. Whitehead, formerly superintendent of rolling mills of the Copperweld Steel Co., Glassport, Pa., has been appointed general superintendent, a recently created position.

S. L. Gibason, formerly assistant superintendent of rolling mills succeeds Mr. Whitehead as superintendent. J. C. Glover is now assistant superintendent of rolling mills.

* * *

George S. Lamson, formerly with the Burton Rogers Mfg. Co., Philadelphia, has been made manager of the Consolidated Equipment Corp., 1433 Fairmount avenue, Philadelphia. H. O. Anderson, formerly with the Maryland Motors Co., Hagerstown, Md., and E. G. McGraw, formerly general manager of the Queen Auto Supply Co. and subsequently with the Oakland division, General Motors Corp., have been added to the sales staff.

* * *

C. L. Bransford, formerly superintendent of blast furnaces and by-product coke works of the Republic Iron & Steel Co., Birmingham, Ala., has been appointed general superintendent of all operating departments, reporting direct to W. H. Oldham, vice president in charge of the company's southern properties.

Joseph G. Walsh was appointed assistant general superintendent, reporting to Mr. Bransford.

William J. Penhallegan, who was superintendent of the Republic company's ore mine operations in the South for many years, has resigned.

* * *

William H. Peterson, identified since 1927 with M. D. Valentine & Bro. Co., Woodbridge, N. J., as vice president in charge of sales also has been elected treasurer. Mr. Peterson at one time was connected with the Carnegie Steel Co. and later was a partner in Charles Hubbard & Co., New York.

W. Harold Hoskier has been elected secretary of M. D. Valentine & Bro. Co. Frank R. Valentine continues as president and M. V. Brown as vice president. This company is one of the oldest fire brick and refractories manufacturers in New Jersey, having operated continuously since 1865.

* * *

B. G. Tarkington has been added to the engineering staff of Ryan, Scully & Co., 3711 Wissahickon avenue, Philadelphia. He was graduated from Purdue university in 1910 but prior to attending college he devoted four years to the machinist's trade. After graduation and until 1923 he was actively identified with the Westinghouse Electric & Mfg. Co. and various public utility organizations specializing on industrial heat which brought him

(*Concluded on Page* 1604)

Continental Export Prices Fixed

Steelmakers Agree on Billets, Plates, Bars and Beams—German Mills Book 5000 Tons of Rails for Egypt—British Markets More Active

European Headquarters,
IRON TRADE REVIEW,
Caxton House, Westminster, S. W.1

LONDON, Dec. 17.—(*By Cable*)—Continental steelmakers have taken definite action in fixing the minimum export price of bars at £5 5s ($25.51) and beams at £4 19s ($24.07), as recommended by the European steel entente, and have also established a minimum export price of £4 11s ($22.11) on billets and £6 4s ($30.13) on plates. Further information from Brussels and Paris indicates the continental markets are quiet. German mills have taken an order for 5000 tons of rails for shipment to Egypt, and report more active demand for bars and plates.

Sentiment in the British market is more cheerful owing to a reduction in the bank rate, and renewed activities by railroads and shipyards resulting in more orders for the northeastern steelworks. One British railroad placed an order for 30 locomotives. Steelmakers are mentioning a possible increase in the price of heavy steel products. The market for galvanized sheets is weak, while tin plate business is expanding. Imported strip steel is selling at £6 17s 6d ($33.29). Larger sales of foundry pig iron are noted; hematite prices are stronger.

Production of pig iron in Great Britain in November totaled 631,400 tons, compared with 688,700 tons in October and 664,600 tons in September. Output of steel ingots and castings in November amounted to 815,000 tons, compared with 889,800 tons in October and 847,900 tons in September. British iron and steel imports in November totaled 250,430 tons, against 229,205 tons in October and 211,958 tons in September. November exports were 382,699 tons, compared with 347,717 tons in October and 261,999 tons in September.

Slack Buying Slows Up British Steel Market

BIRMINGHAM, Eng., Nov. 29.—(*European Staff Service*)—At the Birmingham iron exchange meeting this week there was evidence that the year-end slackening has begun earlier than usual and little new buying is taking place. Furnacemen have sold their output until the end of the year and contracts are being placed for delivery next year. Conditions vary at furnaces but prices have been stabilized until January and a firm tone is maintained. The Central Pig Iron Producers association held its monthly meeting but no decission was announced although there was a discussion with merchants in regard to methods of sale. Foundries are taking good quantities of pig iron but forges object to the high prices and are holding off the market wherever possible.

On the northeast coast expansion of trade is a feature of the pig iron market, consumers having shown more readiness to cover for next year's deliveries. Trade for export is poor.

Midland rolling stock builders have secured orders for 2400 freight cars for the Central Argentine railway. The Metropolitan Cammell Carriage Wagon & Finance Co. Ltd. will build 2060 all steel cars to carry 20 tons, and the Birmingham Railway Carriage & Wagon Co. Ltd. is to make 351 all steel cars. The Union of South Africa railways has been experimenting with locomotives made by a Manchester firm and has awarded 6 similar loco-

Current Iron and Steel Prices of Europe

Dollars at Rates of Exchange, December 16	*British* Gross Tons U. K. Ports	*French* Metric Tons Channel Ports	*Belgium and Luxemburg* Metric Tons Channel Ports	*German* Metric Tons Rotterdam or North Sea Port
Export Prices f. o. b. Ship at Port of Dispatch—By Cable				
PIG IRON	£ s d	£ s d	£ s d	£ s d
Foundry No. 3, Silicon 2.50-3.00	$17.69 3 12 6*	$16.59 3 8 0	$16.59 3 8 0	$17.56 3 12 0
Basic-Bessemer	16.71 3 8 6†	16.59 3 8 0	16.59 3 8 0	16.85 3 9 0
Hematite, Phosphorus 0.02-0.05	19.28 3 19 0	24.82 630*	....	17.81 3 13 0
SEMIFINISHED STEEL				
Billets	$30.50 6 5 0	$22.20 4 11 0	$22.20 4 11 0	$22.45 4 12 0
Wire rods	41.48 8 10 0	31.11 6 7 6	31.11 6 7 6	30.50 6 5 0
FINISHED STEEL				
Standard rails	$40.26 8 5 0	$31.72 6 10 0	$31.72 6 10 0	$32.21 6 12 0
Merchant bars	1.74c 8 0 0	1.16c 5 5 0	1.16c 5 5 0	1.16c 5 5 6
Structural shapes	1.61c 7 7 6	1.09c 4 19 3	1.09c 4 19 3	1.10c 5 0 0
Plates, ship, bridge and tank	1.77c 8 2 6	1.36c 6 4 0	1.36c 6 4 0	1.36c 6 4 0
Sheets, black, 24 gage	2.18c 10 0 0	2.34c 10 12 6	2.34c 10 12 6	2.33c 10 12 0
Sheets, galvanized, 24 gage, corrugated	2.73c 12 10 0	2.87c 13 1 3	2.87c 13 1 3	2.97c 13 10 0
Bands and strips	2.18c 10 0 0	1.24c 5 12 6	1.24c 5 12 6	1.24c 5 12 6
Plain wire, base	2.07c 9 10 0	1.54c 7 0 0	1.54c 7 0 0	1.73c 7 17 0
Galvanized wire, base	3.05c 14 0 0	1.77c 8 1 0	1.77c 8 1 0	1.98c 9 0 0
Wire nails, base	2.40c 11 0 0	1.54c 7 0 0	1.54c 7 0 0	1.71c 7 15 0
Tin plate, base box 108 pounds	$ 4.58 0 18 9	....	....	$ 9.02 1 17 0

*Francs

Domestic Prices at Works or Furnace—Last Reported		Francs		Francs		Marks
Foundry No. 3 Pig Iron, Silicon 2.50—3.00	$17.69 3 12 6	$18.72	475(2)	$17.36	620	$20.37 85
Basic pig iron	16.71 3 8 6	20.09	510(1)	16.24	580	21.80 91
Furnace coke	4.39 0 18 0	6.62	168	5.88	210	5.15 21.50
Billets	30.50 6 5 0	24.43	620	24.92	890	‡8.99 121
Standard rails	1.80c 8 5 0	1.46c	810	1.63c	1,250	1.53c 140
Merchant bars	1.77c 8 2 6	1.31c	730	1.23c	945	1.54c 141
Shapes	1.77c 8 2 6	1.26c	700	1.22c	935	1.50c 138
Plates, ship, bridge and tank	1.93c 8 17 6?	1.46c	810	1.46c	1,125	1.72c 158
Sheets, black, 24-gage	2.29c 10 10 0	2.79c	1,550	2.47c	1,900	2.45c 225
Sheets, galvanized 24 gage, corrugated	2.75c 12 12 6	3.55c	1,970	3.12c	2,400	3.81c 350
Plain wire	2.07c 9 10 0	2.02c	1,100	2.15c	1,650	2.45c 225
Bands and Strips	2.18c 10 0 0	1.47c	810	1.37c	1,050	1.79c 164

*Middlesbrough; †Basic; ‡delivered; (1) Basic-bessemer; (2) Longwy. British export furnace coke £0 18s 0d ($4.39) f. o. b. Ferromanganese £21 13s 0d ($105.65) delivered Atlantic seaboard, duty-paid. German ferromanganese £15 0s 0d ($73.20) f. o. b.

The equivalent prices in American currency are in dollars per ton for pig iron, coke, semi-finished steel and rails; finished steel is quoted in cents per pound and tin plate in dollars per box. British quotations are for basic open-hearth steel; French, Belgian, Luxemburg, and German are for basic-bessemer steel.

motives each weighing 214 tons at an approximate cost of £15,000. These are stated to be the most powerful steam engines ever designed and manufactured in any country outside the United States.

The severity of foreign competition is marked in semifinished steel and lighter forms of steel, such as bars and strip. Billets from the Continent this week have been on an easier basis, being quoted at £5 10s ($26.84) delivered in the Black Country district. But there was no change in steel bars and No. 3 Belgian iron, which could be had at about £6 7s 6d.($31.10). South Wales in particular is complaining of enormous quantities of steel imported into the district. Foreign bars are being delivered to Welsh works at least £1 5s ($6.10) per ton below the price asked by Welsh steelworks. Frank J. Rees, president of the Swansea Metal exchange at a meeting this week estimates that this year 80,000 tons of bars will be imported into South Wales ports alone. He urged that if these imports were prohibited work would result for 3000 men in South Wales.

Sheet bars manufacturers are suffering from the depression in the galvanized sheet trade. Weakness still continues and 24-gage sheets have been offered at £12 12s 6d ($61.60) and even lower, to keep the works active. The tin plate trade has been slightly more active this week. The serious flooding in South Wales has affected about half a dozen works, three of which have had to cease operations entirely. In addition the firm position of tin values has imparted a stronger tone to selling prices of tin plates, with the result that consumers have shown inclination to cover requirements. Negotiations are in progress between Welsh makers and works in France and Germany regarding delimitation of markets on lines similar to those existing between South Wales and the United States.

In the heavy steel mills at Middlesbrough substantial orders have been booked for ship plates, constructional steel and steel sleepers and further business is in prospect. It is stated that most works are well employed although the plant is capable of handling much larger quantities. Some Midland structural firms have been encouraged by renewal of inquiry from railway companies in regard to rebuilding of stations and bridges.

Finished bar iron in South Staffordshire is being taken up for engineering purposes, especially in better qualities. But manufacturers complain of high costs of production, due to high priced pig iron and fuel. In addition much of the raw materials used for nut and bolt making is coming from the Continent.

Price Agreement Adds to Entente's Stabilization Effort

LONDON, Dec. 2.—(*European Staff Service*)—In view of contradictory reports published since the European steel entente recommended a reduction of 10 per cent of the output of its members, it is of interest to state what was the exact position at the end of November.

It will be remembered that the executive committee of the European steel entente met in Paris during the last week of October, and in view of the depreciation of prices on iron and steel export markets, they recommended that the steel output should be reduced by 10 per cent as from Nov. 1. This suggestion was adopted unanimously by all the member countries a few days later, and it became effective Nov. 1. It provides that the November reduction is for quota and members could exceed it by paying the penalty. For December it is a compulsory reduction of actual output which no one is allowed to exceed.

That decision is the only one that was actually taken during November, and no action was taken by the entente with regard to prices, nor was any decision taken with regard to the establishment of international selling syndicates, although it may be assumed that these subjects were discussed by the committee.

Later, in December, representatives of the German and Belgian producers agreed not to quote less than £5 5s for the export price of merchant bars. This was in the form of a gentlemen's agreement, to which, it is understood, French and Luxemburg makers also agreed. This decision, however, was not taken by the committee of the steel entente. As a matter of fact, since the continuance of the existence of the entente is somewhat uncertain, owing to the fact that its term cannot be renewed until the German domestic syndicates themselves have been renewed, no decision of considerable importance could be taken by the entente with great effect.

Undoubtedly the question of international selling syndicates has been very much to the fore since export markets have fallen, but such syndicates cannot be organized until each of the member countries has a domestic selling comptoir, and apart from Germany and France, this is not the case, except for rails and wire rod, which, being well determined products, gave rise to no insuperable difficulties in forming the existing syndicates. With regard to semifinished steel, structural steel, and, still more so, merchant steel and wire products, the question is extremely difficult to solve, in view of the fact that a large number of works manufacture such products, and it would be an arduous task to fix quotas which would be acceptable to all concerned.

There is to be another meeting of the executive committee of the entente at Liege Dec. 3, and the probable course of events will be that, in view of the fact that the 10 per cent reduction of output does not seem a sufficiently drastic step to check the downfall of prices, the recommendation will be made to confirm the arrangement by which the minimum price of £5 5s would be quoted for merchant bars, and possibly a similar recommendation may be made with regard to other commodities. Furthermore. it is probable that such a recommendation, if and when adopted, will simply constitute a gentlemen's agreement.

(Cable advices in IRON TRADE REVIEW Dec. 12 state that the meeting at Liege resulted in approval of the minimum price on steel bars and recommendation of minimum prices on beams and semifinished steel—The Editors.)

French Steel Output Reaches Peak

Paris, Nov. 29.—(*European Staff Service*)—The French output of steel ingots and castings in October exceeded all previous records. The October output included 826,000 tons of ingots and 20,000 tons of steel castings. From the point of view of composition it was composed of 587,000 tons of basic bessemer, 238,000 tons of open-hearth, 11,800 tons of electric, 8000 tons of acid bessemer and 1200 tons of crucible steel.

The October output of pig iron was composed of 702,000 tons of basic bessemer, 102,000 tons of phosphorus foundry, 11,000 tons of semi-phosphorus, 38,000 tons of hematite foundry, 25,000 tons of hematite steelmaking pig iron, and 16,000 tons of ferroalloys. The following table gives comparative figures, in metric tons:

Mon. ave.	Act. Fur. on last day	Pig iron	Steel ingots and castings
1913	131	433,940	390,580
1926	155	785,965	702,500
1927	142	774,785	689,610
1928	153	841,415	782,995
1929			
Jan.	157	904,000	842,000
Feb.	157	782,000	743,000
March	156	880,000	805,000
April	158	871,000	810,000
May	157	897,000	820,000
June	155	865,000	795,000
July	156	878,000	815,000
Aug.	156	893,000	827,000
Sept.	157	857,000	763,000
Oct.	157	894,000	846,000

Belgian Trade Heavy

Brussels, Nov. 29.—(*European Staff Service*)—Exports of pig iron from Belgian and Luxemburg during September were the highest for the year. The principal items exported in September were: Plates and sheets, 58,863 tons; structural steel, 53,015 tons; semifinished steel 48,067 tons; wire rod, 41,895 tons. Comparisons follow, in metric tons:

	IMPORTS		EXPORTS	
Mon. ave.	Pig iron	Other iron and steel	Pig iron	Other iron and steel
1926	27,505	28,000	13,105	305,000
1927	31,760	28,000	11,350	388,000
1928	45,910	38,000	8,240	380,000
1929				
Jan.	51,705	46,000	7,804	269,000
Feb.	37,571	40,000	7,064	291,000
March	53,944	38,000	8,810	398,000
April	60,267	45,000	7,157	428,000
May	70,793	.....	.....	.....
June	58,414	31,000	9,666	646,000
July	74,570	41,000	7,931	359,000
August	57,189	35,000	12,457	362,000
Sept.	55,572	30,000	14,070	428,000

Here and There in Industry

Timely Information Which Records Developments in Various Lines of Productive Enterprise

EASTERN METALS CORP., organized to succeed the Phiiladelphia jobbing establishments of Carter, Donlevy & Co., Gummey, McFarland & Co., and Riter Bros. & Co., has elected the following officers: Chairman, W. H. Donlevy; president, Richard J. Smith; vice president, M. R. Rupp; treasurer, H. B. McFarland; secretary, M. M. Riter; director of sales, Warren Carter. Eastern Metals Corp. will be located in a warehouse at 1736 to 1746 Frankford avenue, Philadelphia, where stocks of tin plate, metals, tools, machines and supplies will be carried.

* * *

AMERICAN MACHINERY SUPPLY CORP. has leased a factory building at 49 to 55 Frelinghuysen avenue, Newark, N. J., to add to its facilities.

* * *

EMPIRE STEEL CORP. has moved its Chicago district sales office to the McGraw-Hill building, 520 North Michigan avenue, suite 1626-27.

* * *

OHIO STEEL FOUNDRY CO., Springfield, O., plans to occupy its new building, 100 x 200 feet, for the production of alloy steel castings.

* * *

CAPITOL STAMPINGS CO., Indianapolis, recently formed by C. R. Swenson, will produce novelty stampings and special tool and die work.

* * *

ARTHUR B. PORTER INC., Salem, Mass., has been formed to deal in machine tools and equipment. Arthur B. Porter, 55 Dearborn street, Salem, is president and treasurer, and Robert W. Hill, 70 Washington street, is clerk.

* * *

NEVILLE & CLEARY INC., Candler building, Atlanta, Ga., and New Orleans, now represent the Edward Valve & Mfg. Co., East Chicago, Ind., in the southeastern states. This is the territory formerly covered by W. J. Neville, deceased.

* * *

APEX STAMPING CO., recently formed by J. L. Rubel, president, has moved from Riverdale, Ill., to Crawfordsville, Ind., and is specializing in the manufacture of small toys. The former plant of the Pioneer Box Co. has been equipped for its use.

* * *

PUGET SOUND & CASCADE RAILWAY has been incorporated for $500,000 and proposes construction of 30 miles of railroad running from Bellingham, Wash., to Potts. This company is a subsidiary of the Puget Sound Pulp & Timber Co. which is erecting a large pulp plant at Everett.

* * *

ENGINEERS METAL PRODUCTS CO., Indianapolis, has started production in the plant formerly occupied by the Robert Structural Steel Co. at 401 South Harding street. The plant of the T. Roch Iron Works, Dorman avenue, will be closed as it has been merged with the new company. Ornamental iron products are being manufactured and a further line is being planned. L. E. Gettin is secretary.

* * *

UNIVERSAL TOOL & DIE CO., 128 Ferry street, Milwaukee, has moved into its new plant at Barclay and Washington streets, a modern two-story structure which cost more than $60,000. In addition, $25,000 has been invested in new tools. The concern was acquired several months ago by the Wrought Washer Mfg. Co., Milwaukee, which has been one of its principal customers for dies and tools.

* * *

STANLEY WORKS, New Britain, Conn., has formed the Stanley Electric Tool Co., which will manufacture and distribute the electrically operated hand tools developed by the Stanley Rule & Level Co., including drills, screw drivers, bench and aerial grinders. Recent acquisition of the Unishear Co., New York, and the Ajax Electric Hammer Corp., New York, adds to the line of tools for the new company.

* * *

RACINE TOOL & MACHINE CO., Racine, Wis., manufacturing power hacksaws, bandsaws, shop tools and machinists' tools, has completed transfer of its plant from 1439-1443 Junction avenue to the former factory of the Davies Shoe Mfg. Co., State street and Carlisle avenue, which has been remodeled. Nearly twice as much space is available in the new plant. Malcolm E. Erskine is president and treasurer of the company.

* * *

VANADIUM WIRE CO. INC., has purchased a plant in Grafton, Mass., including a powerhouse, a boarding house and water rights on the Blackstone river, and intends to begin manufacturing high carbon wire about April 1. The company was incorporated recently for $250,000. Alfred J. Jacobson is president; Eric Jacobson, vice president and works manager; William W. Woodward is treasurer.

* * *

LAYNE & BOWLER INC., Memphis, Tenn., has announced organization of the Layne-Northwest Co., with headquarters at 1023 Wells street, Milwaukee, to handle its business in Wisconsin, and other northwestern states. A Milwaukee office has been maintained for five years. The parent company has plants in Memphis, Houston, Tex., and Los Angeles. Except for irrigation installations, the pumps are motor-driven, direct connected units.

* * *

ALLIS-CHALMERS MFG. CO., Milwaukee, has let contracts for a 1-story factory addition, 200 x 350 feet, to its Monarch Tractor division at Springfield, Ill. The addition will have 60,000 square feet of floor space, with a yard crane runway and railroad siding into the building. The Monarch division manufactures heavy duty units to supplement the light and medium duty tractors built at the main works in West Allis, Milwaukee. The new Springfield project is in charge of Klug & Smith, engineers, Mack block, Milwaukee.

* * *

GRIGSBY-GRUNOW CO., Chicago, manufacturer of radio sets, has purchased the properties of the Yellow Truck & Coach Mfg. Co. in the northwest section of Chicago. The purchase includes 26 acres, improved with a series of 1-story buildings, comprising about 700,000 square feet of working space. The Grigsby-Grunow Co. plans to enlarge its operations to include a diversified line of household utility products. The company has

been occupying under lease the plant which it has purchased, and in addition occupies 350,000 feet of space at 4600 Armitage avenue, Chicago.

* * *

TRAINOR NATIONAL SPRING CO,. New Castle, Ind., has opened a Southwestern sales and distributing office in Waco, Tex.

* * *

BENTON HARBOR SCREW CO., Benton Harbor, Mich., is moving into new quarters on West Main street, and additional equipment is being put in service.

* * *

FERGUSON & EDMONSON CONSTRUCTION CO. has bought from the receiver the plant of Dennison Foundry Co., Dennison, O., and will equip it to handle all repair work on construction equipment.

* * *

INTERNATIONAL IRON & STEEL CORP., Houston, Tex., has moved from Second National Bank building to a new office and warehouse building at 2009 Quitman avenue. D. D. Feldman is general manager.

* * *

STANDARD BRASS & MFG. CO., Port Arthur, Tex., has moved its Houston office to 1015 North San Jacinto street, where warehouse space has been acquired. J. H. Bannister is manager.

* * *

SUPERIOR TOOL & STAMPING CO., Chicago, has moved into its new plant at 4519 Haddon avenue. The new plant is 123 x 125 feet. The company formerly was located on Clinton street.

* * *

TRUSCON STEEL CO. is building an addition to its plant at 5480 East Slauson avenue, Los Angeles, 150 x 160 feet, with crane runway. H. B. Miller is vice president of Pacific coast operations.

* * *

AMERICAN BRAKE SHOE & FOUNDRY CO. of California, which has been operating in leased quarters at Los Angeles, has bought a site on Slauson avenue and will build a foundry with 20,000 square feet of floor.

* * *

GENERAL MFG. CO., Detroit, manufacturer of flexible power presses, has appointed John M. Davie, 2453 Overlook road, Cleveland, its representative in western Pennsylvania and northern Ohio, except Toledo and suburbs.

* * *

WEAN ENGINEERING CO. INC., Warren, O., seller of sheet and tinmill equipment, has been made representative to the steel industry west of Altoona, Pa., for gas producers manufactured by R. D. Wood & Co., Philadelphia.

* * *

JONES & LAUGHLIN STEEL CORP., Pittsburgh, has ordered from H. A. Brassert & Co., Chicago, six hot-blast stove linings and two 40,000-cubic-foot disintegrators and eliminators, to be used in connection with its gas cleaning program at Aliquippa, Pa.

* * *

P H. McARDLE EQUIPMENT CO., New Orleans, has acquired a site for a warehouse and office building at Polk and Hutchinson streets, Houston, Tex., and will move shortly from its present offices in the Second National Bank building. R. E. McArdle is Houston manager.

* * *

THOMPSON & JAMESON CORP., Chicago, dealer in electrical equipment and manufacturer of electric generators for refrigerated trucks, has purchased a 2-story mill constructed building at 360-64 West Superior street, Chicago, to provide for necessary expansion. The building purchased is 70 x 130 feet.

* * *

BARBOUR BROS., Trenton, N. J., has been reorganized as Barbour Bros. Steel Co. Inc., to take over the former firm Jan. 1. Plans are under way to expand the business and to carry larger warehouse stocks of iron and steel, and to enlarge handling and preparing facilities. The company is composed of W. B. Barbour, D. Barbour, W. B. Barbour II, R. M. Barbour and J. S. Barbour.

* * *

TOLEDO STEEL PRODUCTS CO., Toledo, O., is adding to its steel forging equipment to increase its productive capacity. The bolts and bushings formerly manufactured by the Fostoria Screw Co., Fostoria, O., have been taken over and E. R. Pillars, manager of the Fostoria plant, will be in charge of both plants. V. E. Crawford has resigned as manager of the Toledo plant.

* * *

EVERGREEN MINING CO., Ironton, Minn., is building a blacksmith shop and machine shop, the latter 36 x 50 feet and the former 24 x 30 feet. An addition is being built at the end of the sintering plant, which will include two dust collectors of concrete lined with fire brick and a pug mill 12 feet long and 4½ feet in diameter. An inclined conveyor 30 inches wide, with 150 idlers is being installed by the Link-Belt Co., Chicago. A sintering fan is furnished by the Buffalo Forge Co., Buffalo. It will furnish 60,000 cubic feet per minute in addition to the former fan which furnishes 45,000 cubic feet per minute.

Men of Industry

(*Concluded from Page* 1600)

into contact with the electric steel melting furnace industry. In 1923 he became identified with the Globar Corp. as manager of engineering and sales and upon the sale of the Globar interests to the Carborundum Co., he became affiliated with Steinmetz & Co. Inc., which represented Holcroft & Co. in the East. He acted as chief engineer in charge of furnace design and engineering sales.

* * *

Henry A. Taubensee has resigned as vice president and general sales manager of the Continental Steel Corp., Kokomo, Ind., effective Dec. 31. The Continental Steel Corp. was formed about two and a half years ago by a merger of Superior Sheet Steel Co., Canton, O., Chapman Price Steel Co., Indianapolis, and Kokomo Steel & Wire Co., Kokomo. Mr. Taubensee previous to his association with the Continental Steel Corp., was general manager of sales of the Superior Sheet Steel Co. He started his business career with the Massillon Rolling Mill Co., Massillon, O., now a unit of the Central Alloy Steel Corp. After about 10 years in this organization he went to Chicago, where he engaged in business for himself and represented a number of manufacturers, among them the Superior Sheet Steel Co., which he later joined.

* * *

Charles Dreifus, president, Charles Dreifus Co., was re-elected president of the Pittsburgh chapter, Institute of Scrap Iron and Steel Inc., Dec. 12. Other officers re-elected are as follows: Vice president, Ike Wilkoff, Wilkoff Co., Youngstown; secretary, I. W. Solomon, Pittsburgh; and treasurer, Fred W. Wimmer, Hausman-Wimmer Co., Pittsburgh.

The executive committee comprises Chairman H. N. Trimble of H. N. Trimble Co.; Jay G. Stephens, Jay G. Stephens Corp.; Joseph Jacobson, Luria Bros. & Co.; Hugh Ruffner, Wellsville Iron & Metal Co., all of Pittsburgh; Harry Cohn, A. Cohn & Sons, Butler, Pa.; and J. McCann, United Iron & Metal Co., Pittsburgh, to succeed H. Tuch, United Iron & Metal Co.

Charles Bock of M. Bock & Son, Buffalo, was elected president of the Buffalo Chapter.

Louis Hurwitz of Hurwitz Bros. Iron & Metal Co. Inc., Syracuse, N. Y., was elected first vice president and Philip Roth of the Buffalo & Rochester Iron & Metal Co., Syracuse, was elected to the executive committee.

Obituaries

JOHN MORRISON HANSEN, president and chairman of the board of directors of the Standard Steel Car Co., Pittsburgh, died Dec. 13 in La Rochelle, France. Mr. Hansen was born in Butler county, Pennsylvania. He was a graduate of the Western University of Pennsylvania and formerly was chief engineer of the Pressed Steel Car Co. He was president of the Standard Steel Car Co. in 1902 upon its formation, and later became chairman of the board. He has spent considerable time abroad in connection with the foreign interests of the company. He also was a director of the Baldwin Locomotive Works, and president of the American Railway Car institute.

* * *

Frederick L. Wells, 69, an official of the Duner Co., Chicago, railway supplies, died Dec. 9 at Chicago.

* * *

Frank H. Case, 54, secretary-treasurer, Cremer & Case Co., Cleveland, chemists and metallurgists, died Dec. 13.

* * *

David Miller, 79, founder and president of the D. Miller Scrap Iron Co., Green Bay, Wis., died Dec. 9. He settled at Green Bay in 1889.

* * *

Albert B. Stough, 59, office manager at Struthers, O. for the Struthers Furnace Co., died recently at his home near Youngstown, O.

* * *

Walter C. Tiffany, formerly of Portland, Oreg., and manager in Brazil for Dwight P. Robinson Co. of Brazil, engineers, died at Rio de Janeiro, Dec. 9.

* * *

Jacob E. Mesta, affiliated with the sales department of the Mesta Machine Co., Pittsburgh, died Dec. 10 in that city. Mr. Mesta had been associated with the Mesta company for 25 years.

* * *

Joseph Schonthal, 76, president of the Joseph Schonthal Co., Columbus, O., scrap iron and steel broker, died Dec. 15, following an operation performed three weeks ago. He was well known as a philanthropist.

* * *

Cyrus A. Birge, 82, vice president of the Steel Co. of Canada, Hamilton, Ont., since 1910, died Dec. 14. He also was president of the Canada Screw Co., Hamilton, and had numerous other insurance and banking company connections. He was one of the original directors of the Hamilton Blast Furnace Co.

* * *

Samuel T. Weyman, 67, one of the founders of the Atlantic Steel Co., Atlanta, Ga., died as a result of a fall he sustained while fighting a forest fire on his estate Nov. 28. He was for many years vice president of the Connors-Weyman Steel Co., Birmingham, Ala.

* * *

Harry G. Semple, 65, connected with the Jones & Laughlin Steel Corp. for 50 years, died at his home in West Etna, Pa., Dec. 15 of pneumonia following a brief illness. He entered the employ of the Jones & Laughlin company when a boy and for many years has been identified with the Pittsburgh sales office.

* * *

Fred D. Holdsworth, engineer in charge of air compressor design at the Claremont, N. H., plant of the Sullivan Machinery Co. Chicago, from 1900 to 1928 died Nov. 29. He was born in Wales, Mass., in 1867 and was graduated from Worcester Polytechnic institute in 1888. He was mechanical engineer for the Rhode Island Locomotive Works and G. F. Blake Co., afterward Blake & Knowles, and then became affiliated with the Sullivan staff in 1900. He retired about a year ago after having developed several types of air compressors and being awarded almost 50 patents connected with various machines built by the company.

* * *

Maj. James F. Case, 61, since 1928 head of the Paris office of Stone & Webster, and an engineer of international repute, died of heart disease Dec. 14 at the Hotel Grosvenor, New York City. He first engaged in railroad construction work in Oregon and served for several years as director of public works of the Philippines. Major Case was vice president and general manager of the Cuban Engineering & Construction Co. until 1916 when he joined the staff of the American International Corp., extending his engineering activities to Spain and Italy. In 1918 he attended a reconstruction congress in France at the invitation of the French Society of Civil Engineers. He later became affiliated with Ulen & Co. and in 1927 arranged for a $28,000,000 loan from that concern to the Turkish government. He was delegated by the League of Nations in 1926 to report on the transportation system of Poland. Two years later he joined Stone & Webster.

* * *

William H. Rea, 73, former treasurer of the Mesta Machine Co., Pittsburgh, and for many years active in the roll and rolling mill business, died at his home in Pittsburgh Dec. 15. He was educated at Phillips Andover academy and Massachusetts Institute of Technology, and joined the Robinson & Rea Mfg. Co., Pittsburgh, of which his father was one of the founders. When that company was merged with the Leechburg Foundry & Machine Co. as the Mesta Machine Co., Mr. Rea became treasurer of the latter company. For almost 50 years he served as secretary of the Iron Roll association, retiring from that position early this year.

* * *

John Dudley Bird, 61, designer and builder of the first high speed corliss engine, died at his home in Milwaukee Dec. 8. Born in Newark, N. J., he became apprenticed to the Hewes & Phillips Iron Work. He also received instructions from William Kent, author of *Kent's Mechanical Engineer's Hand Book.* In 1890 Mr. Bird formed a partnership to practice consulting engineering as Conover & Co., New York, and designed the Conover condenser. He later was connected with George H. Corliss Steam Engine Co., Providence, R. I.; Frick Co., Waynesboro, Pa.; and Ball & Wood Co., Elizabeth, N. J. In 1901 he was appointed general superintendent of the gas engine department of the Fairbanks-Morse Co., Beloit, Wis. In 1907 he became associated with the International Steam Pump Co. as assistant works manager of the Worthington works at Cudahy, Wis., becoming works manager and resigning in 1923 after handling the liquidation of this plant, to devote his time to banking and finance. During the war, he served as president of the Wisconsin Gun Co., Milwaukee, manufacturing French 75 millimeter field pieces. Mr. Bird was a member of the American Society of Mechanical Engineers.

CONSTRUCTION *and* ENTERPRISE

Concise Timely Business Building Opportunities from Field of Industry

North Atlantic

BRIDGEPORT, CONN.—Baird Machine Co., manufacturer of automatic machinery, has plans for building a plant addition next spring.

HARTFORD, CONN.—Terry Steam Turbine Co., 874 Windsor street, awarded contract for the construction of a boiler house to the A. F. Peaslee Co., 15 Lewis street, Hartford. (Noted Dec. 5.)

MERIDEN, CONN.—Storts Welding Co. will build a new plant next spring on recently acquired property from the Manning Bowman Co., according to announcement by company officials.

MIDDLETOWN, CONN.—Wilcox, Crittenden & Co. Inc., South Main street, manufacturer of marine hardware, is receiving bids for the construction of a one and 2-story foundry and boiler house addition. Lockwood, Greene & Co. Inc., 24 Federal street, Boston, is engineer.

WATERBURY, CONN.—American Brass Co. awarded a contract for the construction of a 1-story shop addition to G. A. Upham Inc., West Main and Ferry streets.

WASHINGTON—Government, care national advisory committee for aeronautics, 3841 Navy building, Eighteenth and B streets, is taking bids until Dec. 27 for a power plant and wind tunnel at Langley field, Va., near here.

BALTIMORE—Loyola college, Father A. S. McEneany president, has plans for a 3-story engineering building. L. R. White, Hearst Tower building, is architect.

BOSTON—T. L. Darcy, 78 Fisher avenue, awarded a contract for an irregular sized 1-story shop building to M. Spinelli & Son, 333 Washington street. Estimated cost about $40,000.

BOSTON—City, care hospital department, will soon take bids on revised plans, by J. H. Ritchie & Associates, 250 Stuart street, for alterations and constructing a 1-story boiler plant addition on River street. Estimated cost about $190,000.

CAMBRIDGE, MASS.—MacAlaster & Bicknell Co., 28 Wendell street, manufacturer of laboratory apparatus, plans construction of an addition to cost about $40,000. Architect has not yet been selected.

SALEM, MASS.—Almy, Bigelow & Washburn, 188 Essex street, had sketches prepared by W. H. Hunt & Son, 208 Essex street for a 1-story garage and repair shop.

SPRINGFIELD, MASS.—Chapman Valve Mfg. Co. plans to make extensive improvements and alterations to its foundry.

SPRINGFIELD, MASS.—United Electric Light Co., 73 State street, will build a substation next year on Common street which will cost about $300,000.

SPRINGFIELD, MASS.—Gilbert & Barker Mfg. Co., Cold Springs avenue, manufacturer of pumps and oil storage tanks, etc., will soon start construction of a warehouse, 110 x 230 feet.

ELIZABETH, N. J.—The portions of the automobile body plant of Fischer & Dackerman, East Broad and Chestnut streets, recently damaged by fire, will be rebuilt immediately.

FLORENCE, N. J.—Florence Pipe Foundry & Machine Co. advises it has awarded a contract for the construction of a 1-story machine shop, 115 x 240 feet, to Herbert H. Conway, 7036 Bywood avenue, Upper Darby, Pa. (Noted Dec. 5.)

HIGH BRIDGE, N. J.—William Prym of America Inc., 16 West Nineteenth street, New York, importer and manufacturers' agent for metal ware, contemplates construction of a plant building here to cost about $200,000.

NEWARK, N. J.—St. Barnabas hospital, 685 High street, is having preliminary plans prepared for a hospital building, nurses' home and power plant. Cron, Lewis & Wieck, 200 Fifth avenue, New York, are architects.

ALBANY, N. Y.—New York Power & Light Corp., 126 Straight street, will build a power house at Conklingville, N. Y., with a capacity of 25,000 horsepower and estimated to cost about $1,000,000. The plant at Spier Falls, N. Y., will also be enlarged at a cost of more than $3,000,000.

BINGHAMPTON, N. Y.—A. & J. Mfg. Co., manufacturer of kitchen tools, is said to have plans for the construction of a plant addition.

BUFFALO—Buffalo Sintering Corp., Marilla street, has filed plans for the construction of a 1-story plant addition estimated to cost about $75,000.

NEW YORK—Edwards & Co., Exterior and 140th streets, manufacturer of fire alarms, awarded contract to the Barney Ahlers Construction Co., 110 West Fortieth street, for a plant building to cost about $75,000.

WAVERLY, N. Y.—Martin Motor Truck Corp., Garden City, Long Island, N. Y., will soon break ground here for the construction of a 1-story manufacturing plant including a power house. Construction is expected to be completed within ninety days.

CLAYSVILLE, PA.—Penn Bridge Co. has reconstruction under way of a building, 60 x 120 feet, which will be used as an erection and machine shop.

PHILADELPHIA—Cramp & Co., Denckla building, has been granted a permit for the construction of a machine shop at Thirty-fourth street and Indiana avenue.

PITTSBURGH—Oliver Iron & Steel Corp., Tenth and Muriel streets, awarded a contract for the construction of a warehouse to Pihl & Miller, Wabash building. Estimated cost about $40,000.

WEST CONSHOHOCKEN, PA.—Philadelphia Electric Co., Ninth and Sansom streets, Philadelphia, contemplates construction of an office, shop and storeroom here to cost about $51,000.

PROVIDENCE, R. I.—Providence Cadillac Co., 9 Federal street, will soon let contract for a two and 3-story repair garage and salesroom, 125 x 215, estimated to cost about $200,000.

East Central

ANTIOCH, ILL.—Antioch Machine & Tool Co., Carl Bruckman, president, has leased the building and part of the equipment of the Corona Pen Co., to manufacture tools, machinery, dies, etc.

CHICAGO—George Forgins Corp., 2118 North Natchez avenue, has been issued a permit for the construction of a 1-story shop, 80 x 100 feet, to cost about $21,000.

CHICAGO—Pheoll Mfg. Co., 5700 West Roosevelt road, producer of machine screw products, is planning the erection of a 3-story and basement addition to its plant, 80 x 300 feet. Alfred S. Alschuler, Chicago, is architect.

CHICAGO—Budget for 1930 of the Standard Gas & Electric Co., 231 South LaSalle street, calls for an expenditure of about $63,700,000 in new construction, additions and extensions to plants and equipment.

CHICAGO—United Autographic Register Co., 2316 West Forty-third street, has purchased a 5-acre tract at California avenue and West

Fiftieth street, in the Kenwood manufacturing district and will erect a one and 2-story building. Frank D. Chase Inc., Chicago, is architect.

CHICAGO—Peoples Gas Light & Coke Co., 122 South Michigan avenue, will soon take bids for the construction of a 2-story pump house at Thirty-fifth street and Crawford avenue.

CHICAGO—Albert Kahn, architect, Marquette building, Detroit, is drawing plans for a 3-story sales and service building for the Packard Motor Car Co., West Grand boulevard, Detroit, to be built on Eugenie street here.

MOLINE, ILL. — Moline Self-Loading Hayrack Co., 502 Peoples Bank building, recently incorporated, has leased space in a building of the Moline Mfg. Co., for manufacturing purposes.

MOLINE, ILL.—Deere & Co., awarded contract for a 5-story warehouse with basement, 138 x 218 feet, to the J. H. Hunzinger & Co., Surety building, Davenport, Iowa. The John Deere Plow Co. is lessee.

TAYLORVILLE, ILL.—Henry Bodendieck has been issued a permit for an extension, 25 x 40 feet, to the building now occupied by the Tips Tool Co., which will be used as a foundry.

WAUKEGAN, ILL.—Chicago, North Shore & Milwaukee railroad, 72 West Adams street, Chicago, is planning to build car and electric locomotive shops here to cost about $1,000,000.

CONNERSVILLE, IND.—Central Mfg. Co., manufacturer of automobile bodies, awarded a contract for the construction of a plant addition to the Austin Co., 16112 Euclid avenue, Cleveland. Estimated cost about $43,000.

INDIANAPOLIS—Electric Steel Castings, Speedway City, has awarded construction contract for a 1-story plant building, 54 x 200 feet, estimated to cost about $44,000.

INDIANAPOLIS—Service Products Corp., 201 South Rural street, manufacturer of automobile accessories, awarded a contract for a 1-story plant addition, 132 x 148 feet, to Charles J. Wacker, 3228 Central avenue.

KNIGHTSTOWN, IND.—McGuire & Shook, architects, 941 North Meridian street, Indianapolis, have completed plans for a $200,000 addition including a power house for the Indiana Soldiers and Sailors Orphans' home here. (Noted April 18.)

DEARBORN, MICH.—City of Dearborn hospital commission, 4912 Maple avenue, care C. B. Hughes, has plans for a group of hospital buildings including a power house. Estimated cost about $1,000,000. Smith, Hinchman & Grylles, Marquette building, Detroit, are architects.

DETROIT—General Motors Corp., General Motors building, discussed plans for establishing an airplane manufacturing plant at a meeting recently with Dr. Claude Dornier. The plant will be financed by General Motors Corp., through the Fokker Corp. of America in which General Motors is interested and may possibly be located in the South.

FLINT, MICH.—Flint Structural Steel Co., Division road, has construction under way of a plant addition, 70 x 200 feet, which will cost about $100,000.

IRON MOUNTAIN, MICH.—Contracts have been let by the county highway commissioner for a shop and warehouse to service and store machinery and equipment. Bids are now being taken for one electric traveling crane. other tools will be purchased after Jan. 1. C. I. Israelson is county engineer.

KALAMAZOO, MICH.—Scott Engineering Co., Lindbergh field, awarded a contract for the construction of a plant building to O. F. Miller, Pratt building.

MONROE, MICH.—Brumlich Buick Sales Co., 11 East Second street, plans building a 1-story sales and service building at Fourth and Monroe streets.

ST. JOSEPH, MICH.—St. Joseph Electric Steel Castings Co. advises it is building a 3-story foundry addition, 40 x 60 feet. Molding and sand handling equipment will be purchased. (Noted Dec. 12.)

TRAVERSE CITY, MICH.—State administration board will receive bids until Dec. 30 for the construction of a 3-story hospital including a detached power house to cost approximately $1,194,000. Angell & Shreve, Book building, Detroit, are architects.

CANTON, O.—York Ice Machinery Corp., Market street south, is considering expansion of production facilities of its dairy equipment division.

CINCINNATI—Cincinnati Tool Co., 1951 Waverly avenue, contemplates construction of a plant addition estimated to cost about $90,000. Architect has not been selected and maturity is indefinite.

CINCINNATI—Cincinnati Steel Castings Co., 1220 Queen avenue, has plans for building a plant addition at Spring Grove avenue and Alabama street. Estimated cost about $20,000.

CLEVELAND—Bender Body Co., 6409 Barberton avenue, has been given a permit for the construction of a 2-story warehouse across the street from its plant.

DAYTON, O.—International Clay Machine Co., manufacturer of industrial cars and machinery, will soon start construction of a 1-story plant addition to cost about $16,000.

DAYTON, O.—Brownell Co., 204 North Findlay street, manufacturer of boilers and engines, plans building an addition, but maturity is indefinite.

ELYRIA, O.—Timms Spring Co., recently damaged by an explosion, has awarded a contract for a new building, 60 x 220 feet, to Henry Heidrich, Elyria. Construction will soon start, according to H. W. Pond, general manager of the company. (Noted Dec. 5.)

FAIRFIELD, O.—Government, care Capt. Laughlin, soon will take bids on the general contract for a 1-story airplane repair and machine shop at the Fairfield air depot. Estimated cost about $150,000.

HAMILTON, O.—H. P. Deuscher Co., Seventh and Hanover streets, has been issued a permit for the construction of a foundry addition.

ST. BERNARD, O.—John Walterman, director of public service, has awarded contracts in connection with boiler room improvements to the electric light plant estimated to cost about $20,000.

TOLEDO, O.—Ohio Bell Telephone Co., 42 East Gay street, Columbus, O., will close bids about Dec. 30 through Mills, Rhines, Bellman & Nordhoff, architects, Ohio building, Toledo, for a 2-story warehouse and garage building. (Noted Nov. 7.)

ASHLAND, WIS.—Lake Superior District Power Co. will spend approximately $1,250,000 for improvements next year, according to W. J. Hodgkins, vice president and general manager.

GREEN BAY, WIS.—Nelson Machinery Co., 131 North Pearl street, will build a one and 2-story machine shop addition, 35 x 81 feet.

GREEN BAY, WIS.—Contracts have been awarded by John Hoell & Co., machinists, 7225 Roosevelt street, for the construction of a 1-story shop addition, 40 x 60 feet.

NEW LONDON, WIS.—Little Wolf Power Co. expects to call for bids for the construction of a 1350-horsepower hydroelectric generating plant on the Little Wolf river near here as soon as plans by L. A. DeGuere, consulting engineer, Wisconsin Rapids, Wis., have been finally approved by the state utilities commission. Dr. W. H. Finney is president.

OCONTO, WIS.—Gordon & Buolt, 53 West Jackson boulevard, consulting engineers, Chicago, expect to complete plans about Jan. 1 for the proposed improvements to the local municipal water plant costing $40,000 and including new electrically-driven deep well pumps, a new standpipe, etc. P. T. Meeuwsen is city clerk.

RACINE, WIS.—Sealed proposals are being asked until Dec. 26 by the board of vocational education, T. S. Rees, director, for the construction of the new 3-story vocational school, 68 x 128 feet, on a site at Eighth and Center streets. (Noted Dec. 12.)

Southern States

SHREVEPORT, LA.—Beaird Corp. is said to have plans for spending about $250,000 for improvements to its welding shop.

FONTANA, N. C.—Swain County Mining Co., recently incorporated, care S. G. Bernard, is reported to have plans for spending approximately $2,500,000 on developing mining operations here.

WILSON, N. C.—City, care Milo R. Maltbie, city engineer, authorized a $300,000 bond issue to be used for improvements to the municipal power plant.

SAND SPRINGS, OKLA.—Protective Metals Co., care W. E. McCandlish, manager, has plans for the construction of a sheet metal plant to cost about $100,000.

FRANKLIN, TENN.—Nashville Interurban Railway Co., 533 Broad street, Nashville, Tenn., will soon start construction of a steam power plant here to cost about $170,000.

DALLAS, TEX.—State highway department, Austin, Tex., has plans for building a 1-story repair shop for road machinery and a 1-story storage and distribution building to cost about $50,000 with equipment.

DALLAS, TEX.—Byron Good, 3720 Travis, owner of hangar at Love field, recently destroyed by fire with $250,000 loss, will replace with modern steel structure costing full as much.

FT. WORTH, TEX.—Spring Service Co., 1117 North Henderson street, has changed its name to Camp Spring Co. and plans plant improvements.

FT. WORTH, TEX.—Trinity Valley Iron &

(*Concluded on Page* 1609)

Machinery

Buying Tapers Off as Holidays Approach —Look for Active First Quarter—Rumor Price Increase in Grinders

A GRADUAL end-of-the-year tapering off in machine tool activity is noted in most districts and until after the holidays it is thought no decisive spurt will be registered. No cancellations have been reported and prices are holding firm, pressure for concessions being resisted. Grinders have shown some strength this month and there are rumors of price increases in this quarter, attributed to the unceasing demand for more refinements in grinding equipment. Export trade in grinders continues brisk. Norfolk & Western railroad has placed several tools and the Chicago, North Shore & Milwaukee is planning car and electric locomotive shops at Waukegan, Ill., to cost about $1,000,000. Other railroad work is quiet. Prospects for first quarter are brighter.

New York, Dec. 17.—Machine tool buying slows up gradually. December is running behind last year with some dealers and builders. Several of the largest buyers are out of the market until early next year. Buying is confined to one or two units at a time, but is well spread. While orders have slipped off, the slump has not been serious. Inquiries are in fair volume. There have been no cancellations reported. Prices are steady. Pressure for lower prices from some buyers has been resisted.

Deliveries improve gradually, although six to eight weeks holds for most standard tools. Machine tool plants continue on slightly reduced operating schedules. Bearing plants have cut operations in some instances, but several are planning a 10 per cent increase next month. Machine motor builders are busy with sizable orders booked well ahead. The metalworking industries continue to inquire for equipment. One Connecticut interest took two large milling machines and inquiries are out for two more. Heavy tools are moving in moderate volume. The first quarter of 1930 is expected to bring more activity in steel mill and foundry equipment as expansion programs progress.

Grinding machinery has slowed up considerably due largely to curtailment of engine building in the automobile and airplane fields. Some dealers do not expect much change in grinding equipment buying before Feb. 1. Export trade in this branch continues brisk.

Crane business is seasonally fair with some increase in inquiry. New York Central railroad has ordered a 10-ton electric traveling crane from the Shepard-Niles Crane & Hoist Corp. for its Harmon, N. Y., shops. Inquiries include an electric operated locomotive crane with 70-foot boom and bucket, for Albert Friedsam, Pittsburgh, and a 2 to 5-ton gasoline operated crane for the Tri-State Pipe Co., Bellaire, O.

Worcester, Mass., Dec. 17.—A growing optimism prevails in the machinery market. Grinders which last month were on production of 75 to 80 per cent capacity are exhibiting strength this month and prospects for a good month are bright. In fact shop talk in many quarters mentions increased prices, indicating no lack of confidence in the market. Continual demand for refinements is believed responsible. Lathes and drills are slow and spotty but manufacturers look for a turn in the tide about Feb. 1. Small tools, wheels, sprockets and auxiliary lines are reported satisfactory.

Pittsburgh, Dec. 17.—Machine tools are in a quiet market with both awards and inquiry slower than during November. Action on considerable pending work is being held up until after the holidays. Pending work continues in good volume and prospects for first quarter are regarded as favorable. Railroads generally are inactive in the market although Norfolk & Western has placed several tools.

Cleveland, Dec. 17.—Quiet prevails along the machinery front, most inquiry and awards being scattered and for single units. One dealer reports the slowest December in several years. However, an undertone of optimism exists, with machinery houses confidently expecting a resumption of good business after the first of the year. No new large lists have appeared. Prices are firm, some reports being heard of upward revisions but these probably are contemplated only by the larger companies whose financial position is such that immediate business is not a requisite. Despite the weak position of the market no cancellations have appeared. Electrical interests are steady purchasers of equipment.

Chicago, Dec. 17.—Fair scattered machine tool sales are reported in this market, with encouraging prospects for the early months of next year. The sales volume is estimated at about 60 to 65 per cent of the peak activity before the let-down of two and one-half months ago. Compared with a year ago, the volume seems small, as a brisk market existed in December, 1928. A general machine shop in the Chicago district made important purchases during the week, and tool and die shops continue active. Western Electric Co. is awarding outside tool and die work, but has little work to offer now to the jobbing machine shops. Inquiry is promising, but much of the projected work is being postponed for a while. A subsidiary of the General Electric Co. will buy tools later for a plant in this district, while Chicago, North Shore & Milwaukee railroad is planning car and electric lomocotive shops at Waukegan, Ill., to cost about $1,000,000. A fair amount of work is in sight in Iowa, and several Milwaukee concerns are expected to be in the market later. Machine tool builders are busy against orders placed earlier in the year, and are catching up on shipments.

Urges New York To Rate Up Structurals

New York, Dec. 17.—An increase in permissible stresses of structural steel from 16,000 pounds to 18,000 pounds per square inch has been recommended by special committees of the Merchants' association studying a new building code for New York at the request of Mayor Walker.

Provision for a wind load of 20 pounds a square foot, instead of 30 pounds as present, also was favored, the committee recommending that the entire wind pressure be taken up in the frame.

A committee also recommended that welding and in some cases bolting be permitted as a cheaper means of construction and also for a reduction of noise.

Of the suggested increase in permissible steel stresses the report says:

"Our recommended working stresses are based upon the established facts that the steel now going into our buildings has an ultimate strength of over 60,000 pounds per square inch and a yield point which averages about 37,000 pounds per square inch.

"It is our belief that there is no case on record where a high working stress has been the cause of the failure of a steel frame structure; and that with all other factors unchanged 18,000 pounds is as safe as 16,000 pounds."

Hoist Bookings Decline

New York, Dec. 17.—November orders for electric hoists decreased 10.62 per cent in number, compared with October, according to figures just released by the Electric Hoist Manufacturers association. The value of these orders fell by 7.225 per cent from October bookings. Shipments were 3.6738 per cent off from the previous month.

Leitelt Iron Works, Grand Rapids, Mich., has changed its capital from $150,000 common and $100,000 preferred to $100,000 preferred and 7000 shares no par value.

Construction and Enterprise

(*Continued from Page* 1607)

Steel Co. has completed installation of sand blasting and mixing equipment for finishing ornamental castings and will enlarge pattern storage capacity. O. K. Black is manager.

HOUSTON, TEX.—G. A. Humason, Petroleum building, will soon start construction of a plant for manufacturing a blow-out preventer and well tester, recently invented.

HOUSTON, TEX.—Gearenach Mfg. Co., 317 Hughes street, plans addition to machine shop, 48 x 48 feet.

HOUSTON, TEX.—Houston Pipe & Supply Co. will build a new pipe shop and enlarge its pipe handling facilities at 1900 Nance street. M. Levis is general manager.

HOUSTON, TEX.—Fred C. Pruitt, 1120 Chenevert street, will build a plant, 54 x 130 feet, at 1315 Polk avenue for manufacture of auto springs.

HOUSTON, TEX.—Midwest Piping Supply Co., 1452 South Second street, St. Louis, has tentative plans for construction of branch plant and warehouse on Calhoun road.

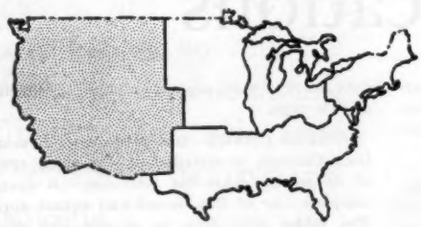
SAN ANTONIO, TEX.—Woodmen of the World, care A. W. Frazer, president, Woodmen of the World building, Omaha, Nebr., has sketches for a proposed central heating plant at the hospital here.

West Central

CEDAR RAPIDS, IOWA—Iowa Railway & Light Corp. contemplates the construction of a hydroelectric plant here estimated to cost about $2,000,000. Maturity is indefinite.

WICHITA, KANS.—Allsteel Products Mfg. Co., advises it recently awarded a contract for a 2-story building for the office and engineering departments. A 75 x 150 foot addition will be added in the near future which will include traveling crane equipment. (Noted Dec. 5.)

ST. LOUIS—City, care board of education, 911 Locust street, will take bids about Jan. 15 for the construction of a 5-story vocational school estimated to cost about $950,000.



Western States

HOLLYWOOD, CALIF.—Woodlite Ltd. has started construction of a plant for manufacturing automobile lights here. Estimated cost about $250,000 with equipment.

LOS ANGELES—Victor Talking Machine Co., 1016 North Sycamore street, has construction under way of a plant addition, 90 x 161 feet. The main plant is at Camden, N. J.

LOS ANGELES—Miller Schofield Inc., 2652 Long Beach avenue, manufacturer of racing cars and marine engines, has plans for enlarging its plant in the near future. (Noted Oct. 31.)

SAN DIEGO, CALIF.—State, care department of public works, division of architecture, Sacramento, Calif., will receive bids Dec. 24 for a 1-story power house for the State teachers college here.

PUEBLO, COLO.—Southern Colorado Power Co., Colorado building, plans power plant expansions at Canon City, Skaguay and Pueblo estimated to cost about $150,000.

HOOD RIVER, OREG.—Stevens & Koon, Portland, consulting engineers, have submitted a report recommending construction of a power plant costing $50,000, proposed by the city.

OGDEN, UTAH—American Can Co. of Utah has plans for enlarging its plant providing the city permanently closes Grant avenue between Twentieth and Twenty-first streets.

SALT LAKE CITY, UTAH—Mortuary Service Co., 7045 South State street, awarded a contract for a 1-story casket plant, 70 x 120 feet, to the Bowers Construction Co., Salt Lake City, estimated to cost about $65,000. (Noted Nov. 28.)

SPOKANE—Peter Young has the general contract for construction of a $12,500 warehouse for the Feenaughty Machinery Co., Spokane.

Canada

LOIS RIVER, B. C.—Powell River Power Co., Powell River, B. C., has awarded contract for first unit of proposed power plant here to cost $2,000,000 to Stuart Cameron Co. Ltd., 543 Granville street, Vancouver, B. C. R. Bell-Irving is engineer. (Noted Nov. 14.)

VICTORIA, B. C.—Canadian Pacific railway, Vancouver, B. C., awarded contract for a power house for the Empress hotel here to Carter, Halls, Aldinger & Co., Victoria. Estimated cost is about $600,000 and construction will start at once.

BELLEVILLE, ONT.—It is reported that Stewart-Warner Corp., Chicago, plans to consolidate its Canadian units in one plant. With this intent, a plant will be established here to consist of two buildings, each two stories. The first will be 50 x 180 feet and the second 40 x 50 feet. (Noted Aug. 22.)

SAULT STE. MARIE, ONT.—According to an announcement by officials of the Superior Alloys Ltd., who are establishing a plant here for the manufacture of ferrosilicon, now nearing completion, a new furnace for the manufacture of calcium molybdate will also be installed. This second unit will represent almost as much in the way of expenditure as the plant now about finished. Hon. James Lyons is president. (Noted Oct. 17.)

BEAUHARNOIS, QUE.—Several contracts have been awarded by the Beauharnois Light, Heat & Power Co., 1117 St. Catharine street, west, Montreal, Que., in connection with canal and power development plant to be constructed here. Other contracts pending include two locomotive cranes; rock crushing equipment; 16 locomotives; and two construction derricks. (Noted Sept. 5.)

Recent Incorporations

CHICAGO—Arquette Construction Co., 160 North LaSalle street, has been incorporated with $20,000 capital to engage in construction business, by John A. Russell.

CHICAGO—F. P. Smith Wire & Iron Works, 2340 Clybourn avenue, has been incorporated with 5000 shares of no par stock to manufacture and sell structural and ornamental iron, steel and other metals, by George W. Dammann.

CHICAGO—William Ganshow Co., 1001 Washington boulevard, has been incorporated with 100 shares of no par stock to manufacture and deal in castings, forgings and machinery, etc., by William H. Chamberlain.

CHICAGO — McCollom Products Corp., 32 North State street, has been incorporated with 200,000 shares of no par stock to manufacture and sell washers, nuts, bolts, etc., by W. R. McCollom. The G. H. S. Sales Co., room 1414, 32 North State street, is correspondent.

HOLTON, KANS.—Holton Electric Hoist Co. has been incorporated with $25,000 capital to manufacture and sell electric hoists and rotary road drags, by M. A. Bender.

DETROIT—National Broach & Machine Co. has been incorporated with $225,000 capital to manufacture machinery, tools and castings, by Robert S. Drummond, 1168 Boston boulevard west.

DETROIT—Scherling Hicks Inc., 2987 Franklin streets, has been incorporated with $75,000 capital to manufacture and sell electrical devices, by Gustave J. Scherling.

DETROIT—Progressive Building Co., 11450 Shoemaker avenue, has been incorporated with $100,000 capital to engage in contracting and building, by Alexander Pyde.

GLEN RIDGE, N. J.—National Products Corp. has been incorporated with 1000 shares of common stock to manufacture metal products, by Edward Heyman, 290 Broadway, New York.

HILLSIDE, N. J.—Eureka Metal Refinishing

Co. has been incorporated with $50,000 capital, by William W. Wimmer, attorney, 30 Ridge road, North Arlington, N. J.

HOBOKEN, N. J.—Gerbehy Bros. & Sons Inc. has been incorporated with $100,000 capital to engage in the general construction business, by George M. Eichler, 37 Newark avenue, Hoboken.

HOBOKEN, N. J.—Robert Mayer & Co. has been incorporated with $100,000 capital to manufacture grained zinc plates, by Besson & Applegate, attorneys, 84 Washington street, Hoboken.

JERSEY CITY, N. J.—Universal Flyers of New Jersey Inc. has been incorporated with 500 shares of common stock to manufacture airplanes, by the Corporation Trust Co., 15 Exchange place, Jersey City.

JERSEY CITY, N. J.—Van Winkle Development Co., machinery for milling, has been incorporated with 5000 shares of common stock, by Marshall Van Winkle, 1 Exchange place, Jersey City.

NEWARK, N. J.—Solvoid Co. has been incorporated with 1000 shares of common stock to manufacture chemicals, by Furst & Furst, attorneys, 60 Park place, Newark.

NEWARK, N. J.—Sunset Construction Co. has been incorporated with $50,000 capital to engage in the contracting business, by Frank G. Masini, 20 Branford place, Newark.

PATERSON, N. J.—Cosmevo Surgical Supply Co. of Hackensack has been incorporated with $100,000 capital to manufacture surgical instruments, by Viviano & Kehoe, attorneys, 126 Broadway, Paterson.

NEW YORK — Belman By-Products Corp., metal, has been incorporated with $250,000 capital, by T. A. Kane, 140 Nassau street.

NEW YORK—Beaver Smithtainer Mfg. Corp., refrigerators, has been incorporated with 400 shares of common stock, by H. C. MacArthur, 205 East Forty-second street.

WATERTOWN, N. Y.—Coty Machine Co. has been incorporated with $200,000 preferred and 20,000 shares of common stock, by E. M. Boyer, Watertown.

BEECHWOOD, O.—Pattern Engineering & Mfg. Co., has been incorporated with 250 shares of no par stock, by Bartholomew, Leeper & McGill, attorneys, Engineers Bank building, Cleveland.

CINCINNATI—General Radial Drill Co. has been incorporated with $150,000 capital, by Harry C. Busch, attorney, First National Bank building.

DEFIANCE, O.—L. F. Serrick Inc. has been incorporated with $100,000 capital to manufacture machinery and screw machine products, through Frazer, Hiett, Wall & Effler, attorneys, Home Bank building, Toledo, O.

TOLEDO, O.—Brown-Moss Stamping Co. has been incorporated and leased a plant at 727 Lorain street, by L. O. Brown and Fred G. Moss.

YOUNGSTOWN, O.—Electric Equipment Co. has been incorporated with $75,000 capital, by Ford, Bennett & Powers, First National Bank building.

CORNWALL, ONT.—W. Bingley & Sons Ltd. has been incorporated to operate a machine shop, foundry, shipwright and dock repairing business with a capital of $100,000 and 700 shares of no par stock, by Wallace Bingley, Roy Bingley and George A. Stiles, all of Cornwall.

TORONTO, ONT.—Wilson & Hargrave Ltd. has been incorporated to manufacture and deal in automobiles, motors and motorcycles with $40,000 capital. Provisional directors are Gordon McLaughlin, John S. McLaughlin and Edith Baillie, all of Toronto.

WINDSOR, ONT.—United Metal Sales & Manufacturers Ltd. has been incorporated to manufacture and deal in hardware, with a capital stock of $100,000 and 50,000 shares of no par stock. Provisional directors are Robert McAlpine, Aaron H. Gingerich and Daniel Thompson, all of Windsor.

MONTREAL, QUE.—Montreal Neon Signs Ltd. has been incorporated to manufacture and deal in electrical signs and appliances with $40,000 capital, by Harold E. Walker, West Mount, Que., Frank B. Chauvin and George M. Marrotte, Montreal, west.

New Trade Publications

AIR COMPRESSORS—A bulletin by the Chicago Pneumatic Tool Co., New York, covers a line of small compressors of vertical type, power driven. Illustrations cover details of construction and data sheets supplement them.

ASPHALT PLANTS—A one-car railroad asphalt plant produced by the Merriman Asphalt Plant Inc., Lima, O., is featured in a bulletin by that company. Illustrations tell most of the story, with a minimum of text.

DIAMOND TOOL BORING—Automatic Machine Co., Bridgeport, Conn., will start in January the issue of a series of bulletins on diamond tool boring. They will be loose-leaf, with a suitable holder, and will be issued each month.

DRILLS—Morse Twist Drill & Machine Co., New Bedford, Mass., has issued a leaflet describing a line of drills of cobalt steel for drilling hard materials without loss of speed. A list of sizes and prices is included.

INDUSTRIAL TRUCKS—Truscon Steel Co., Youngstown, O., in a current circular, shows operation of its line of trucks for use in industrial plants. Other products, steel boxes and platforms, are also illustrated.

ELECTRIC HOISTS—Robbins & Myers Inc., Springfield, O., in a current bulletin presents its line of electric hoists, with illustrations showing the hoists and details, dimension tables, prices, specifications and instructions for installation.

LATHES — Jones & Lamson Machine Co., Springfield, Vt., has issued two bulletins, one describing its 24-inch Fay automatic lathe and the other a flat turret lathe. Each is well illustrated and the text is clear in explanation.

WELDING—Design in arc welding is the subject of a current bulletin by the Lincoln Electric Co., Cleveland. It sketches the similarities and deviations in design as between riveting and welding in building up structural members, illustrating by sketches.

COOLING TOWERS—Edward Burhorn Co., Bayone, N. J., in a leaflet under the title of "Streams of Gold," illustrates how the use of its cooling towers to remove heat from water effects large savings in industry. Illustrations show actual installations and results obtained in service are stated.

SPOT WELDERS—American Electric Fusion Corp., Chicago, in a current bulletin sets forth claims of its spot welding equipment for joining metals. Operation is described and illustrations show details of the welder. A table of specifications is furnished. A detail tracing shows dimensions.

TRAMRAIL—Cleveland Electric Tramrail division of the Cleveland Crane & Engineering Co., Wickliffe, O., devotes a bulletin to the subject of cleaning, storage and shipping of materials in a foundry by the overhead system. Illustrations show the method installed in existing plants.

BOILERS—A 72-hour test of a boiler in the East River station of the New York Edison Co. is covered in a reprint of a report by W. H. Lawrence, chief engineer of the company, which is being circulated by the Combustion Engineering Corp., New York. That the boiler attained 532 per cent rating for 72 hours is a matter of pride to the builders.

INSULATORS—Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., has issued a booklet on its apparatus insulators. These have a wide application in assembling switchgear assemblies, bus supports, disconnecting switches and the like. The bulletin gives information and test data on the company's new line of insulators of this type.

SPRING CHART—Danly Machine Specialties Inc., Chicago, is distributing the third revision of its spring chart for wall use. It covers a complete line of flat, round and square springs. The tables give data as to the size of hole in which the spring will work, inside diameter of the spring, size of wire, loading, maximum compression and other data.

CENTRIFUGAL SEPARATORS — Sharples Separator Co., West Chester, Pa., has issued a bulletin on its super-centrifugal separator, which is in use in many branches of industry to separate materials of different specific gravities. Uses include reclaiming of oil and varnish clarification. Illustrations and diagrams explain its use and results that may be obtained.

POLISHING AND BUFFING—Lathes for polishing and buffing are featured in a bulletin by Hammond Machinery Builders Inc., Kalamazoo, Mich., formerly Hill-Curtis Co. The lathes are electric driven and speed can be varied easily to obtain desired results. The bulletin shows details of construction and accessories to be used in connection with the lathes. Other products of the company are also illustrated.

ROLLER CHAIN—Link-Belt Co., Chicago and Indianapolis, has published a roller chain data book which constitutes a complete manual for properly selecting and applying chain. It contains 96 pages illustrating construction of chains and wheels, followed by views of practical applications of roller chain on light and heavy-duty industrial drives and on machinery, tractors, trucks and farm machinery. A list of wheels up to 81 inches in diameter is presented. The data are designed to enable selection of the proper chain and wheels for individual conditions and to show costs.

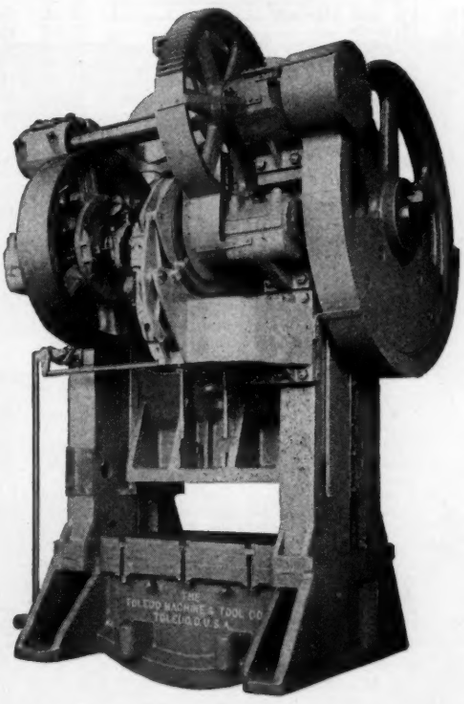
Timkens Defy Torque In Toledo Presses

Sudden starts—sudden stops—all day and every day.

Fly wheels weighing thousands of pounds whirled around at a terrific rate—from stop to full speed, and from full speed to stop in a few seconds.

Think of the enormous torque and radial loads imposed upon the fly wheel clutch bearings by these huge presses, as heavy metal is moulded like clay in their irresistible embrace.

But the Toledo Machine & Tool Company, Toledo, Ohio, manufacturers of Toledo presses, are not worried—they have solved the fly wheel clutch bearing problem for all time by standardizing on Timkens.



For Timken Bearings defy all loads and shocks, preserve alignment of parts, reduce maintenance costs and extend machine life—in all types of shop equipment.

They have so revolutionized all previous ideas of production and production costs that users of machine tools, presses and other equipment have found that it often pays to discard obsolete machinery in favor of "Timken-Equipped".

And once secured, Timken benefits become permanent assets—through the exclusive combination of Timken tapered construction, Timken *POSITIVELY ALIGNED ROLLS* and Timken steel.

THE TIMKEN ROLLER BEARING COMPANY, CANTON, OHIO

TIMKEN *Tapered Roller* **BEARINGS**

Pipe and Tube Prices—Plate Extras

Steel Pipe

Pittsburgh and Lorain basing discounts, jobber's carloads.

Evanston, Ill., and Indiana Harbor, Ind., take differential 2 points less discount.

Chicago takes differential 2½ points less than Pittsburgh-Lorain basis.

Butt Weld

	Black	Galvanized
⅛-inch	45	19½
¼ and ⅜-inch	51	25½
½-inch	56	42½
¾-inch	60	48½
1 to 3-inch	62	50½

Lap Weld

2-inch	55	43½
2½ to 6-inch	59	47½
7 to 8-inch	56	43½
9 and 10-inch	54	41½
11 and 12-inch	53	40½

REAMED AND DRIFTED

Butt Weld

1 to 3-inch	60	48½

Lap Weld

2-inch	53	41½
2½ to 6-inch	57	45½

EXTRA STRONG—PLAIN ENDS

Butt Weld

⅛-inch	41	24½
¼ and ⅜-inch	47	30½
½-inch	53	42½
¾-inch	58	47½
1 to 1½-inch	60	49½
2 to 3-inch	61	50½

Lap Weld

2-inch	53	42½
2½ to 4-inch	57	46½
4½ to 6-inch	56	45½
7 to 8-inch	52	39½
9 and 10-inch	45	32½
11 and 12-inch	44	31½

DOUBLE EXTRA STRONG

Butt Weld

½-inch	42	32½
¾ to 1½-inch	45	35½
2 to 2½-inch	47	37½

To jobbers these discounts are increased by 1 point and two supplementary discounts of 5 per cent on black, and 1½ points and two supplementary discounts of 5 per cent on galvanized.

Wrought Iron Pipe

Pittsburgh basing discounts, jobbers' carloads. Individual quotations made on delivered basis.

THREADS AND COUPLINGS

Butt Weld

	Black.	Galv.
⅛ and ¼-inch	+11	+36
⅜-inch	23	5
½-inch	28	11
¾-inch	31	15
1 and 1¼-inch	35	18
1½ and 2-inch	35	18

Lap Weld

1¼ and 1½-inch	Upon application	
2-inch	23	9
2½ to 3½-inch	28	12
4 to 6-inch	30	17
7 and 8-inch	29	16
9 to 12-inch	26	11

REAMED AND DRIFTED

2-inch to 6-inch—Two points less than above

EXTRA STRONG, PLAIN ENDS

⅛ and ¼-inch	+13	+48
⅜-inch	23	7
½-inch	28	12
¾ to 2-inch	34	18

Lap Weld

2-inch	29	18
2½ to 4-inch	34	20
4½ to 6-inch	33	19
7 and 8-inch	31	17
9 to 12-inch	21	8

DOUBLE EXTRA STRONG

Butt Weld

½-inch	+47½	+59½
¾-inch	+28	+40
1-inch	+34	+46
1¼-inch	+28	+40
1½-inch	+27	+39

Lap Weld

2 and 2½-inch	+13	+25
3 to 4-inch	+ 8	+17
4½ to 6-inch	+ 9	+18
8-inch	+12	.....

Jobbers obtain additional preferential discounts of 1, 5 and 2½ on black and galvanized wrought iron pipe.

On extra or double extra strong pipe fitted with threads and couplings basing discount lowered 5 points from plain end price. Fitted with threads only, basing discount lowered 3 points for random lengths.

Boiler Tubes

Pittsburgh carload discounts

STEEL (Lap Weld)

2 and 2¼-inch	38 off
2½ and 2¾-inch	46 off
3-inch	52 off
3¼ to 3¾-inch	54 off
4-inch	57 off
4½ to 6-inch	46 off

Subject to two 5 per cent discounts on full carload shipments. On less than 10,000 pounds, base discount reduced 6 points and one 5 per cent allowed. Over 10,000 pounds to carload, base discount reduced 4 points and two 5 per cents allowed.

CHARCOAL IRON

1½-inch	1 off
1¾-inch	8 off
2 and 2¼-inch	13 off
2½ and 2¾-inch	16 off
3-inch	17 off
3¼ to 3½-inch	18 off
4-inch	20 off
4½-inch	21 off

Subject to 10 per cent discount on full carload lots. On less than 10,000 pounds, base discount reduced 2 points and no preferential allowed. On 10,000 pounds to carload, 5 per cent preferential allowed.

SEAMLESS COLD DRAWN

1-inch	61 off
1¼ and 1½-inch	53 off
1¾-inch	37 off
2 and 2¼-inch	32 off
2½ and 2¾-inch	40 off
3-inch	46 off
3¼ and 3½-inch	48 off
4-inch	51 off
4½, 5 and 6-inch	40 off

SEAMLESS HOT ROLLED

1¾-inch	37 off
2 and 2¼-inch	38 off
2½ and 2¾-inch	46 off
3-inch	52 off
3¼ and 3½-inch	54 off
4-inch	57 off
4½, 5 and 6-inch	46 off

Subject to 5 per cent supplementary discount for carload lots. On less than 10,000 pounds, base discount reduced 6 points. On 10,000 pounds to carload, base discount reduced 4 points and one 5 per cent allowed.

SEAMLESS STEEL MERCHANT BOILER TUBES

Extras:

Add 5 per cent for lengths over 24 feet and not over 26 feet.

Smaller tubes than 1-inch and lighter than standard gage to be sold at mechanical tubing list and discount.

Intermediate sizes and gages not listed above take price of next larger outside diameter and heavier gage.

SEAMLESS STEEL MECHANICAL TUBING

Base Discounts on New List July 1, 1925

Carbon 0.10 to 0.30 per cent.....50 to 55 off

Carbon 0.30 to 0.40 per cent.....45 to 50 off

Plus usual extras for forming and for long lengths over 18 feet and for commercially exact lengths.

SEAMLESS STEEL LOCOMOTIVE AND SUPERHEATER TUBES

Outside diameter	Gage	Net prices per foot f.o.b. Pittsburgh Price
2-inch	12-gage	14¼c
2-inch	11-gage	15c
2-inch	10-gage	16c
2¼-inch	12-gage	16c
2¼-inch	11-gage	17c
2¼-inch	10-gage	18c
3-inch	7-gage	33c
5⅜-inch	9-gage	50c
5½-inch	9-gage	52c

Plus usual extras for forming and for lengths over 24 feet.

Plate Extras

BASE

Rectangular plates, tank steel or conforming to manufacturers' Standard Specifications for structural steel, date Nov. 24, 1922, or equivalent, ¼-inch thick and over on thinnest edge (except for ¼-inch or 72 inches wide when ordered to weight in pounds per square foot—see width and gage extras), 100 inches wide and under, down to but not including 6 inches wide, 5 feet 0 inches long up to published limit in length but not over 80 feet 0 inch, are base. Extras per pound for width or diameter.

All Plates Rectangular or Otherwise

¼-inch thick and heavier, but not less than 11 pounds per square foot, if ordered to weight.

Over 100 to and including 110 inches	.05c
Over 110 to and including 115 inches	.10c
Over 115 to and including 120 inches	.15c
Over 120 to and including 125 inches	.25c
Over 125 to and including 128 inches	.50c

Plates less than ¼-inch or lighter than 11 pounds per square foot.

Over 72 to and including 84 inches	.10c
Over 84 to and including 96 inches	.20c
Over 96 to and including 100 inches	.30c

Over 100 inches add .35c to width extras for plates ¼-inch thick and heavier.

GAGE

Plates Not Exceeding 72 Inches Wide

Plates less than ¼-inch gage, to and including $\frac{7}{16}$-inch; or lighter than 10.2 pounds per square foot, to and including 7.65 pounds square foot..... .20c

Plates Over 72 Inches Wide

Plates less than ¼-inch gage, to and including $\frac{7}{16}$-inch; or lighter than 11 pounds per square foot, to but not including 7.65 pounds square foot.... .20c

Plates ordered 7.65 pounds square foot .30c

QUALITIES

Pressing steel	.10c
Flange steel (boiler grade)	.15c
Ordinary firebox steel	.20c
Stillbottom steel	.30c
Locomotive firebox steel	.50c
Marine steel	1.50c
Hull materials subject to U. S. Navy Dept. specifications for medium or soft steel	.10c
High tensile hull steel subject to U. S. navy department or equivalent specifications	1.00c
Boiler steel subject to U. S. navy department specifications, classes A-B	1.50c
Hull plates to hull specifications, required to stand cold flanging, take extra for flange steel.	

Floor Plates

Checkered plates 1.75c

Checkered plates are not furnished to sketch and are rolled from "Stock Steel" only. No physical tests will be made on checkered plates.

INSPECTION

Mill inspection .....No extra

Charges for other inspection, such as Lloyd's or American bureau of shipping, will be made by inspection bureau direct to buyer.

CUTTING

LENGTH OR DIAMETER

All Plates, Rectangular or Otherwise

Five feet and over up to published limit of length, but not over 80 feet	No extra
Under 5 feet to 3 feet inclusive	.10c
Under 3 feet to 2 feet inclusive	.25c
Under 2 feet to 1 foot inclusive	.50c
Under 1 foot	1.55c
Over 80 feet to 100 feet inclusive	.10c

Over 100 feet add .25c plus .05c for every additional 2 feet or fraction thereof.

Regular Sketches

With not more than four straight cuts. (Including straight taper plates)

Additional extra ..... .10c

Irregular Sketches

With not more than four straight cuts. (Sketches cannot be sheared with re-entrant angles)

Additional extra ..... .20c